

# SEQUENCE LISTING

<110> O'Donnell, Michael E.  
Yuzhakov, Alexander  
Yurieva, Olga  
Jeruzalmi, David  
Bruck, Irina  
Kuriyan, John

<120> ENZYMES DERIVED FROM THERMOPHILIC ORGANISMS THAT  
FUNCTION AS A CHROMOSOMAL REPLICASE, PREPARATION AND  
USE THEREOF

<130> 22221/1030

<140>

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<150> 60/143,202

<151> 1997-04-08

<150> 08/823,407

<151> 1997-04-08

<150> 09/057,416

<151> 1998-04-08

<160> 212

<170> PatentIn Ver. 2.1

<210> 1

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<212> DNA

<213> Thermus thermophilus

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 Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly  
 35 40 45  
 Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly  
 50 55 60  
 Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg  
 65 70 75 80  
 Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser  
 85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu  
 100 105 110  
 Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser  
 115 120 125  
 Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro  
 130 135 140  
 His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro  
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 Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu  
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 Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg  
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 Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly  
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 Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu  
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 Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro  
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 Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala  
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 Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln  
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 325 330 335  
 Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro  
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Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro  
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Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe  
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Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg  
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Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys  
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Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro  
420 425 430

Leu Ala Gln Ala His Phe Gly Val Glu Glu Val Val Leu Val Leu Glu  
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Gly Glu Lys Lys Ser Leu Ser Pro Arg Pro Arg Pro Ala Pro Pro Pro  
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Glu Ala Pro Ala Pro Pro Gly Pro Pro Glu Glu Glu Val Glu Ala Glu  
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Glu Ala Ala Glu Glu Ala Pro Glu Glu Ala Leu Arg Arg Val Val Arg  
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<212> DNA

<213> Thermus thermophilus

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ttctccgggc ccagggggtt gggcaagacc accacggcga ggctcctcgc catggcggtg 180  
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<212> PRT

<213> *Thermus thermophilus*

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35 40 45

Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly

50 55 60

Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg

65 70 75 80

Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser

85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu  
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 Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser  
 115 120 125  
 Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro  
 130 135 140  
 His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro  
 145 150 155 160  
 Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu  
 165 170 175  
 Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg  
 180 185 190  
 Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly  
 195 200 205  
 Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu  
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 Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro  
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 Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr  
 245 250 255  
 Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala  
 260 265 270  
 Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu  
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 Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln  
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 Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu  
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 325 330 335  
 Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro  
 340 345 350

Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro  
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Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe  
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Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg  
385 390 395 400

Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys  
405 410 415

Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro  
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<213> *Thermus thermophilus*

<400> 5

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Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly  
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Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg  
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Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser

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			260					265					270				
Pro	Arg	Ser	Leu	Val	Ser	Gly	Leu	Leu	Glu	Val	Phe	Arg	Glu	Gly	Leu		
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Tyr	Ala	Ala	Phe	Gly	Leu	Ala	Gly	Thr	Pro	Leu	Pro	Ala	Pro	Pro	Gln		
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Ala	Arg	Arg	Ser	Asp	Ala	Leu	Ser	Leu	Glu	Val	Ala	Leu	Leu	Glu	Ala		
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34

<210> 9  
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31

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 Ser Leu Gly Arg Ile His His Ala Tyr Leu Phe Ser Gly Thr Arg Gly  
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 Glu Thr Gly Ile Thr Ala Thr Pro Cys Gly Val Cys Asp Asn Cys Arg  
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 Glu Ile Glu Gln Gly Arg Phe Val Asp Leu Ile Glu Ile Asp Ala Ala  
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 Ser Arg Thr Lys Val Glu Asp Thr Arg Asp Leu Leu Asp Asn Val Gln  
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 Tyr Ala Pro Ala Arg Gly Arg Phe Lys Val Tyr Leu Ile Asp Glu Val  
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 His Met Leu Ser Arg His Ser Phe Asn Ala Leu Leu Lys Thr Leu Glu  
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 Glu Pro Pro Glu His Val Lys Phe Leu Leu Ala Thr Thr Asp Pro Gln  
                   145                                  150                                  155                                  160  
 Lys Leu Pro Val Thr Ile Leu Ser Arg Cys Leu Gln Phe His Leu Lys  
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 Ala Leu Asp Val  
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<212> PRT

<213> Bacillus subtilis

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Leu Gln Lys Lys Phe Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly

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Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys  
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85 90 95  
Ser Asn Asn Gly Val Asp Glu Ile Arg Asp Ile Arg Asp Lys Val Lys  
100 105 110  
Phe Ala Pro Ser Ala Val Thr Tyr Lys Val Tyr Ile Ile Asp Glu Val  
115 120 125  
His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu  
130 135 140  
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Val Gly Lys Thr Ser Ile Ala Arg Leu Leu Ala Lys Gly Leu Asn Cys  
50 55 60

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Ala	Leu	Asp	Val	Glu	Gln	Ile	Arg	His	Gln	Leu	Glu	His	Ile	Leu	Asn	180	185	190	
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Ala	Ala	Glu	Gly	Ser	Leu	Arg	Asp	Ala	Leu	Ser	Leu	Thr	Asp	Gln	Ala	210	215	220	
Ile	Ala	Ser	Gly	Asp	Gly	Gln	Val	Ser	Thr	Gln	Ala	Val	Ser	Ala	Met	225	230	235	240
Leu	Gly	Thr	Leu	Asp	Asp	Asp	Gln	Ala	Leu	Ser	Leu	Val	Glu	Ala	Met	245	250	255	
Val	Glu	Ala	Asn	Gly	Glu	Arg	Val	Met	Ala	Leu	Ile	Asn	Glu	Ala	Ala	260	265	270	
Ala	Arg	Gly	Ile	Glu	Trp	Glu	Ala	Leu	Leu	Val	Glu	Met	Leu	Gly	Leu	275	280	285	
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<210> 22

<211> 294

<212> PRT

<213> Haemophilus influenzae

<400> 22

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Val	Gly	Lys	Thr	Ser	Ile	Ala	Arg	Leu	Phe	Ala	Lys	Gly	Leu	Asn	Cys	
	50					55					60					
Val	His	Gly	Val	Thr	Ala	Thr	Pro	Cys	Gly	Glu	Cys	Glu	Asn	Cys	Lys	
	65				70					75					80	
Ala	Ile	Glu	Gln	Gly	Asn	Phe	Ile	Asp	Leu	Ile	Glu	Ile	Asp	Ala	Ala	
				85					90						95	
Ser	Arg	Thr	Lys	Val	Glu	Asp	Thr	Arg	Glu	Leu	Leu	Asp	Asn	Val	Gln	
			100					105					110			
Tyr	Lys	Pro	Val	Val	Gly	Arg	Phe	Lys	Val	Tyr	Leu	Ile	Asp	Glu	Val	
			115				120					125				
His	Met	Leu	Ser	Arg	His	Ser	Phe	Asn	Ala	Leu	Leu	Lys	Thr	Leu	Glu	
						135					140					
Glu	Pro	Pro	Glu	Tyr	Val	Lys	Phe	Leu	Leu	Ala	Thr	Thr	Asp	Pro	Gln	
145					150					155					160	
Lys	Leu	Pro	Val	Thr	Ile	Leu	Ser	Arg	Cys	Leu	Gln	Phe	His	Leu	Lys	
				165				170						175		
Ala	Leu	Asp	Glu	Thr	Gln	Ile	Ser	Gln	His	Leu	Ala	His	Ile	Leu	Thr	
			180					185					190			
Gln	Glu	Asn	Ile	Pro	Phe	Glu	Asp	Pro	Ala	Leu	Val	Lys	Leu	Ala	Lys	
		195					200					205				
Ala	Ala	Gln	Gly	Ser	Ile	Arg	Asp	Ser	Leu	Ser	Leu	Thr	Asp	Gln	Ala	
	210					215					220					
Ile	Ala	Met	Gly	Asp	Arg	Gln	Val	Thr	Asn	Asn	Val	Val	Ser	Asn	Met	
225					230					235					240	

Leu Gly Leu Leu Asp Asp Asn Tyr Ser Val Asp Ile Leu Tyr Ala Leu  
245 250 255

His Gln Gly Asn Gly Glu Leu Leu Met Arg Thr Leu Gln Arg Val Ala  
260 265 270

Asp Ala Ala Gly Asp Trp Asp Lys Leu Leu Gly Glu Cys Ala Glu Lys  
275 280 285

Leu His Gln Ile Ala Leu  
290

<210> 23

<211> 294

<212> PRT

<213> Bacillus subtilis

<400> 23

Met Ser Tyr Gln Ala Leu Tyr Arg Val Phe Arg Pro Gln Arg Phe Glu  
1 5 10 15

Asp Val Val Gly Gln Glu His Ile Thr Lys Thr Leu Gln Asn Ala Leu  
20 25 30

Leu Gln Lys Lys Phe Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly  
35 40 45

Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys  
50 55 60

Glu His Ala Pro Val Asp Glu Pro Cys Asn Glu Cys Ala Ala Cys Lys  
65 70 75 80

Gly Ile Thr Asn Gly Ser Ile Ser Asp Val Ile Glu Ile Asp Ala Ala  
85 90 95

Ser Asn Asn Gly Val Asp Glu Ile Arg Asp Ile Arg Asp Lys Val Lys  
100 105 110

Phe Ala Pro Ser Ala Val Thr Tyr Lys Val Tyr Ile Ile Asp Glu Val  
115 120 125

His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu  
130 135 140

Glu Pro Pro Glu His Cys Ile Phe Ile Leu Ala Thr Thr Glu Pro His

145                      150                      155                      160  
 Lys Ile Pro Leu Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Lys  
                                  165                      170                      175  
 Arg Ile Thr Ser Gln Ala Ile Val Gly Arg Met Asn Lys Ile Val Asp  
                                  180                      185                      190  
 Ala Glu Gln Leu Gln Val Glu Glu Gly Ser Leu Glu Ile Ile Ala Ser  
                                  195                      200                      205  
 Ala Ala His Gly Gly Met Arg Asp Ala Leu Ser Leu Leu Asp Gln Ala  
                                  210                      215                      220  
 Ile Ser Phe Ser Gly Asp Ile Leu Lys Val Glu Asp Ala Leu Leu Ile  
 225                      230                      235                      240  
 Thr Gly Ala Val Ser Gln Leu Tyr Ile Gly Lys Leu Ala Lys Ser Leu  
                                  245                      250                      255  
 His Asp Lys Asn Val Ser Asp Ala Leu Glu Thr Leu Asn Glu Leu Leu  
                                  260                      265                      270  
 Gln Gln Gly Lys Asp Pro Ala Lys Leu Ile Glu Asp Met Ile Phe Tyr  
                                  275                      280                      285  
 Phe Arg Asp Met Leu Leu  
                                  290  
  
 <210> 24  
 <211> 300  
 <212> PRT  
 <213> Caulobacter crescentus  
  
 <400> 24  
 Asp Ala Tyr Thr Val Leu Ala Arg Lys Tyr Arg Pro Arg Thr Phe Glu  
   1                      5                      10                      15  
 Asp Leu Ile Gly Gln Glu Ala Met Val Arg Thr Leu Ala Asn Ala Phe  
                                  20                      25                      30  
 Ser Thr Gly Arg Ile Ala His Ala Phe Met Leu Thr Gly Val Arg Gly  
                                  35                      40                      45  
 Val Gly Lys Thr Thr Thr Ala Arg Leu Leu Ala Arg Ala Leu Asn Tyr  
                                  50                      55                      60

Glu	Thr	Asp	Thr	Val	Lys	Gly	Pro	Ser	Val	Asp	Leu	Thr	Thr	Glu	Gly	65	70	75	80
Tyr	His	Cys	Arg	Ser	Ile	Ile	Glu	Gly	Arg	His	Met	Asp	Val	Leu	Glu	85	90	95	
Leu	Asp	Ala	Ala	Ser	Arg	Thr	Lys	Val	Asp	Glu	Met	Arg	Glu	Leu	Leu	100	105	110	
Asp	Gly	Val	Arg	Tyr	Ala	Pro	Val	Glu	Ala	Arg	Tyr	Lys	Val	Tyr	Ile	115	120	125	
Ile	Asp	Glu	Val	His	Met	Leu	Ser	Thr	Ala	Ala	Phe	Asn	Ala	Leu	Leu	130	135	140	
Lys	Thr	Leu	Glu	Glu	Pro	Pro	Pro	His	Ala	Lys	Phe	Ile	Phe	Ala	Thr	145	150	155	160
Thr	Glu	Ile	Arg	Lys	Val	Pro	Val	Thr	Ile	Leu	Ser	Arg	Cys	Gln	Arg	165	170	175	
Phe	Asp	Leu	Arg	Arg	Val	Glu	Pro	Asp	Val	Leu	Val	Lys	His	Phe	Asp	180	185	190	
Arg	Ile	Ser	Ala	Lys	Glu	Gly	Ala	Arg	Ile	Glu	Met	Asp	Ala	Leu	Ala	195	200	205	
Leu	Ile	Ala	Arg	Ala	Ala	Glu	Gly	Ser	Val	Arg	Asp	Gly	Leu	Ser	Leu	210	215	220	
Leu	Asp	Gln	Ala	Ile	Val	Gln	Thr	Glu	Arg	Gly	Gln	Thr	Val	Thr	Ser	225	230	235	240
Thr	Val	Val	Arg	Asp	Met	Leu	Gly	Leu	Ala	Asp	Arg	Ser	Gln	Thr	Ile	245	250	255	
Ala	Leu	Tyr	Glu	His	Val	Met	Ala	Gly	Lys	Thr	Lys	Asp	Ala	Leu	Glu	260	265	270	
Gly	Phe	Arg	Ala	Leu	Trp	Gly	Phe	Gly	Ala	Asp	Pro	Ala	Val	Val	Met	275	280	285	
Leu	Asp	Val	Leu	Asp	His	Cys	His	Ala	Ser	Ala	Val	290	295	300					

<210> 25

<211> 260

<212> PRT

<213> Mycoplasma genitalium

<400> 25

Met His Gln Val Phe Tyr Gln Lys Tyr Arg Pro Ile Asn Phe Lys Gln  
1 5 10 15

Thr Leu Gly Gln Glu Ser Ile Arg Lys Ile Leu Val Asn Ala Ile Asn  
20 25 30

Arg Asp Lys Leu Pro Asn Gly Tyr Ile Phe Ser Gly Glu Arg Gly Thr  
35 40 45

Gly Lys Thr Thr Phe Ala Lys Ile Ile Ala Lys Ala Ile Asn Cys Leu  
50 55 60

Asn Trp Asp Gln Ile Asp Val Cys Asn Ser Cys Asp Val Cys Lys Ser  
65 70 75 80

Ile Asn Thr Asn Ser Ala Ile Asp Ile Val Glu Ile Asp Ala Ala Ser  
85 90 95

Lys Asn Gly Ile Asn Asp Ile Arg Glu Leu Val Glu Asn Val Phe Asn  
100 105 110

His Pro Phe Thr Phe Lys Lys Lys Val Tyr Ile Leu Asp Glu Ala His  
115 120 125

Met Leu Thr Thr Gln Ser Trp Gly Gly Leu Leu Lys Thr Leu Glu Glu  
130 135 140

Ser Pro Pro Tyr Val Leu Phe Ile Phe Thr Thr Thr Glu Phe Asn Lys  
145 150 155 160

Ile Pro Leu Thr Ile Leu Ser Arg Cys Gln Ser Phe Phe Phe Lys Lys  
165 170 175

Ile Thr Ser Asp Leu Ile Leu Glu Arg Leu Asn Asp Ile Ala Lys Lys  
180 185 190

Glu Lys Ile Lys Ile Glu Lys Asp Ala Leu Ile Lys Ile Ala Asp Leu  
195 200 205

Ser Gln Gly Ser Leu Arg Asp Gly Leu Ser Leu Leu Asp Gln Leu Ala  
210 215 220

Ile Ser Leu Ile Val Lys Lys Leu Val Leu Leu Met Leu Lys Lys His  
225 230 235 240



Leu Ile Ser Leu Ile Glu Met Gln Asn Leu Leu Leu Leu Lys Gln Phe  
 245 250 255

Tyr Gln Glu Ile  
 260

<210> 26

<211> 289

<212> PRT

<213> *Thermus thermophilus*

<400> 26

Val Ser Ala Leu Tyr Arg Arg Phe Arg Pro Leu Thr Phe Gln Glu Val  
 1 5 10 15

Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu  
 20 25 30

Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly  
 35 40 45

Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly  
 50 55 60

Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg  
 65 70 75 80

Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser  
 85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu  
 100 105 110

Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser  
 115 120 125

Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro  
 130 135 140

His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro  
 145 150 155 160

Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu  
 165 170 175

Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg

	180		185		190
Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly					
195		200		205	
Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu					
210		215		220	
Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro					
225		230		235	240
Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr					
	245		250		255
Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala					
	260		265		270
Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu					
	275		280		285

Tyr

<210> 27  
 <211> 94  
 <212> DNA  
 <213> Thermus thermophilus

<400> 27  
 gccggaggga gaaaaaaaaa gccgagccca aggccccgcc cggccccacc ccgaagcgcc 60  
 cgcacccccg ggccccccga ggaggaggag aggc 94

<210> 28  
 <211> 11  
 <212> PRT  
 <213> Thermus thermophilus

<400> 28  
 Val Leu Glu Gly Glu Lys Lys Ser Leu Ser Pro  
 1 5 10

<210> 29  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

09716964-112100

<220>

<223> Description of Artificial Sequence: primer

<400> 29

cacgcntacc tnttctccgg nac

23

<210> 30

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 30

gtgctcnggn ggctcctcnt cngtc

25

<210> 31

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 31

gtgggatccg tggttctgga tctcgatgaa gaa

33

<210> 32

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 32

gtgggatcca cggscststcs gagcagaag

29

<210> 33

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 33

gcgggatacct caacgaggac ctctccatct tcaa

34

<210> 34

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 34

gcgggatacct tgcgtcsag sgtsagsgcg tcgta

35

<210> 35

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 35

gggaaggacc agcgcgtact cccctgctc ctaggtgtg

39

<210> 36

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 36

gtgtggatcc ttcttcttsc ccatsgc

27

<210> 37

<211> 27

<212> DNA

<213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 37  
 caccgattcc agtggtgcct aggtgtg 27  
  
 <210> 38  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 38  
 caacacctgg tgttccagga gcctgtgctt 30  
  
 <210> 39  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 39  
 ccagaatcgt ctgctggctg tag 23  
  
 <210> 40  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 40  
 agcaccctgg aggagcttc 19  
  
 <210> 41  
 <211> 19  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 41

catgtcgtac tgggtgtac

19

<210> 42

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<220>

<221> unsure

<222> (7)

<223> N at any position in this sequence is A, C, G, or  
T

<400> 42

gtsgtstnng acnnsagac sacsggg

27

<210> 43

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<220>

<221> unsure

<222> (8)

<223> N at any position in this sequence is A, C, G, or  
T

<400> 43

gaasccsnng tcgaasnng cgttgtg

27

<210> 44

<211> 27

<212> DNA

<213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 44  
 cggggatcca cctcaatcac ctcgtgg 27  
  
 <210> 45  
 <211> 30  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 45  
 cggggatccg ccaccttgcg gtcgcgggtg 30  
  
 <210> 46  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 46  
 gcgctctaga cgagttcca aagcgtgcgg t 31  
  
 <210> 47  
 <211> 25  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 47  
 cgcgtctaga tcacctgtat ccaga 25  
  
 <210> 48  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 48  
gcggcgcata tgggtggtggt cctggacctg gag 33

<210> 49  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 49  
cgcggtctaga tcacctgtat ccaga 25

<210> 50  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 50  
gtsctsgtsa agacscactt 20

<210> 51  
<211> 21  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 51  
sagsagsgcg ttgaasgtgt g 21

<210> 52  
<211> 22  
<212> DNA  
<213> Artificial Sequence



<220>

<223> Description of Artificial Sequence: primer

<400> 52

ctcgttggtg aaagtttccg tg

22

<210> 53

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 53

ctcgttggtg aaagtttccg tg

22

<210> 54

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 54

tctggcaaca cgttctggag cacatcc

27

<210> 55

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 55

tgctggcggt catcttcagg atg

23

<210> 56

<211> 23

<212> DNA

<213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 56  
 catcctgaag atgaacgcca gca 23  
  
 <210> 57  
 <211> 25  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 57  
 aggttatcca caggggtcat gtgca 25  
  
 <210> 58  
 <211> 29  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 58  
 gtgtgtcata tgaacataac gggtcccaa 29  
  
 <210> 59  
 <211> 29  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: primer  
  
 <400> 59  
 gcgcgaattc tcccttgtgg aaggettag 29  
  
 <210> 60  
 <211> 13  
 <212> PRT  
 <213> Thermus thermophilus

<400> 60

Arg Val Glu Leu Asp Tyr Asp Ala Leu Thr Leu Asp Asp

1

5

10

<210> 61

<211> 14

<212> PRT

<213> *Thermus thermophilus*

<400> 61

Phe Phe Ile Glu Ile Gln Asn His Gly Leu Ser Glu Gln Lys

1

5

10

<210> 62

<211> 8

<212> PRT

<213> *Thermus thermophilus*

<400> 62

Phe Phe Ile Glu Ile Gln Asn His

1

5

<210> 63

<211> 8

<212> PRT

<213> *Thermus thermophilus*

<400> 63

Tyr Asp Ala Leu Thr Leu Asp Asp

1

5

<210> 64

<211> 6

<212> PRT

<213> *Thermus thermophilus*

<400> 64

Ala Met Gly Lys Lys Lys

1

5

<210> 65

<211> 9

<212> PRT

<213> Thermus thermophilus

<400> 65

Phe Asn Lys Ser His Ser Ala Ala Tyr

1

5

<210> 66

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

<400> 66

Val Val Xaa Asp Xaa Glu Thr Thr Gly

1

5

<210> 67

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

<400> 67

His Asn Ala Xaa Phe Asp Xaa Gly Phe

1

5

<210> 68

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

<400> 68

Val Val Xaa Asp Xaa Glu Thr Thr Gly

1

5

<210> 69

<211> 7  
 <212> PRT  
 <213> *Thermus thermophilus*

<400> 69  
 Val Leu Val Lys Thr His Leu  
           1                  5

<210> 70  
 <211> 6  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: peptide

<400> 70  
 His Arg Ala Leu Tyr Asp  
           1                  5

<210> 71  
 <211> 7  
 <212> PRT  
 <213> *Thermus thermophilus*

<400> 71  
 His Thr Phe Asn Ala Leu Leu  
           1                  5

<210> 72  
 <211> 34  
 <212> PRT  
 <213> *Escherichia coli*

<400> 72  
 Asp Arg Tyr Phe Leu Glu Leu Ile Arg Thr Gly Arg Pro Asp Glu Glu  
           1                  5                  10                  15

Ser Tyr Leu His Ala Ala Val Glu Leu Ala Glu Ala Arg Gly Leu Pro  
                   20                  25                  30

Val Val

<210> 73  
<211> 34  
<212> PRT  
<213> *Vibrio cholerae*

<400> 73  
Asp His Phe Tyr Leu Glu Leu Ile Arg Thr Gly Arg Ala Asp Glu Glu  
1 5 10 15  
Ser Tyr Leu His Phe Ala Leu Asp Val Ala Glu Gln Tyr Asp Leu Pro  
20 25 30  
Val Val

<210> 74  
<211> 34  
<212> PRT  
<213> *Haemophilus influenzae*

<400> 74  
Asp His Phe Tyr Leu Ala Leu Ser Arg Thr Gly Arg Pro Asn Glu Glu  
1 5 10 15  
Arg Tyr Ile Gln Ala Ala Leu Lys Leu Ala Glu Arg Cys Asp Leu Pro  
20 25 30  
Leu Val

<210> 75  
<211> 34  
<212> PRT  
<213> *Rickettsia prowazekii*

<400> 75  
Asp Arg Phe Tyr Phe Glu Ile Met Arg His Asp Leu Pro Glu Glu Gln  
1 5 10 15  
Phe Ile Glu Asn Ser Tyr Ile Gln Ile Ala Ser Glu Leu Ser Ile Pro  
20 25 30  
Ile Val

<210> 76  
 <211> 34  
 <212> PRT  
 <213> *Helicobacter pylori*

<400> 76  
 Asp Asp Phe Tyr Leu Glu Ile Met Arg His Gly Ile Leu Asp Gln Arg  
 1 5 10 15  
 Phe Ile Asp Glu Gln Val Ile Lys Met Ser Leu Glu Thr Gly Leu Lys  
 20 25 30  
 Ile Ile

<210> 77  
 <211> 34  
 <212> PRT  
 <213> *Synechocystis* sp.

<400> 77  
 Asp Asp Tyr Tyr Leu Glu Ile Gln Asp His Gly Ser Val Glu Asp Arg  
 1 5 10 15  
 Leu Val Asn Ile Asn Leu Val Lys Ile Ala Gln Glu Leu Asp Ile Lys  
 20 25 30  
 Ile Val

<210> 78  
 <211> 34  
 <212> PRT  
 <213> *Mycobacterium tuberculosis*

<400> 78  
 Asp Asn Tyr Phe Leu Glu Leu Met Asp His Gly Leu Thr Ile Glu Arg  
 1 5 10 15  
 Arg Val Arg Asp Gly Leu Leu Glu Ile Gly Arg Ala Leu Asn Ile Pro  
 20 25 30  
 Pro Leu

<210> 79  
 <211> 46  
 <212> PRT  
 <213> Escherichia coli

<400> 79  
 Asn Lys Arg Arg Ala Lys Asn Gly Glu Pro Pro Leu Asp Ile Ala Ala  
 1 5 10 15  
 Ile Pro Leu Asp Asp Lys Lys Ser Phe Asp Met Leu Gln Arg Ser Glu  
 20 25 30  
 Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Asp  
 35 40 45

<210> 80  
 <211> 46  
 <212> PRT  
 <213> Vibrio cholerae

<400> 80  
 Asn Pro Arg Leu Lys Lys Ala Gly Lys Pro Pro Val Arg Ile Glu Ala  
 1 5 10 15  
 Ile Pro Leu Asp Asp Ala Arg Ser Phe Arg Asn Leu Gln Asp Ala Lys  
 20 25 30  
 Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Glu  
 35 40 45

<210> 81  
 <211> 46  
 <212> PRT  
 <213> Haemophilus influenzae

<400> 81  
 Asn Val Arg Met Val Arg Glu Gly Lys Pro Arg Val Asp Ile Ala Ala  
 1 5 10 15  
 Ile Pro Leu Asp Asp Pro Glu Ser Phe Glu Leu Leu Lys Arg Ser Glu  
 20 25 30  
 Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Asp  
 35 40 45



<210> 82  
 <211> 46  
 <212> PRT  
 <213> Rickettsia prowazekii

<400> 82  
 Cys Lys Lys Leu Leu Lys Glu Gln Gly Ile Lys Ile Asp Phe Asp Asp  
 1 5 10 15  
 Met Thr Phe Asp Asp Lys Lys Thr Tyr Gln Met Leu Cys Lys Gly Lys  
 20 25 30  
 Gly Val Gly Val Phe Gln Phe Glu Ser Ile Gly Met Lys Asp  
 35 40 45

<210> 83  
 <211> 45  
 <212> PRT  
 <213> Helicobacter pylori

<400> 83  
 Leu Lys Ile Ile Lys Thr Gln His Lys Ile Ser Val Asp Phe Leu Ser  
 1 5 10 15  
 Leu Asp Met Asp Asp Pro Lys Val Tyr Lys Thr Ile Gln Ser Gly Asp  
 20 25 30  
 Thr Val Gly Ile Phe Gln Ile Glu Ser Gly Met Phe Gln  
 35 40 45

<210> 84  
 <211> 46  
 <212> PRT  
 <213> Synechocystis sp.

<400> 84  
 Gln Glu Arg Lys Ala Leu Gln Ile Arg Ala Arg Thr Gly Ser Lys Lys  
 1 5 10 15  
 Leu Pro Asp Asp Val Lys Lys Thr His Lys Leu Leu Glu Ala Gly Asp  
 20 25 30  
 Leu Glu Gly Ile Phe Gln Leu Glu Ser Gln Gly Met Lys Gln  
 35 40 45

<210> 85  
 <211> 46  
 <212> PRT  
 <213> Mycobacterium tuberculosis

<400> 85  
 Ile Asp Asn Val Arg Ala Asn Arg Gly Ile Asp Leu Asp Leu Glu Ser  
 1 5 10 15  
 Val Pro Leu Asp Asp Lys Ala Thr Tyr Glu Leu Leu Gly Arg Gly Asp  
 20 25 30  
 Thr Leu Gly Val Phe Gln Leu Asp Gly Gly Pro Met Arg Asp  
 35 40 45

<210> 86  
 <211> 3729  
 <212> DNA  
 <213> Thermus thermophilus

<400> 86  
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 aaggccgccc tcaaggacgt ggcccgggtc tacggcatcc cccacaagaa ggcggaggaa 1560

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ttggccaagc tcatcccggg gcagttcggg aagcccaagc ccctgcagga ggccatccag 1620
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ggaggtcctt ctccaggcg gccaggcggg ggaggcccag gaggcggtgc cttctaggg 3660
ggtgggccgt gagacctag gccatcgctt tcgccggggg caaggaggcc tgggcccgc 3720
cccttttg 3729

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<210> 87

<211> 1245

<212> PRT

<213> *Thermus thermophilus*

<400> 87

Met Gly Arg Glu Leu Arg Phe Ala His Leu His Gln His Thr Gln Phe

1

5

10

15

Ser Leu Leu Asp Gly Ala Pro Lys Leu Ser Asp Leu Leu Lys Trp Val  
 20 25 30  
 Glu Glu Thr Thr Pro Glu Asp Pro Ala Leu Ala Met Thr Asp His Gly  
 35 40 45  
 Asn Leu Phe Gly Ala Val Glu Phe Tyr Lys Lys Ala Thr Glu Met Gly  
 50 55 60  
 Ile Lys Pro Ile Leu Gly Tyr Glu Ala Tyr Val Ala Ala Glu Ser Arg  
 65 70 75 80  
 Phe Asp Arg Lys Arg Gly Lys Gly Leu Asp Gly Gly Tyr Phe His Leu  
 85 90 95  
 Thr Leu Leu Ala Lys Asp Phe Thr Gly Tyr Gln Asn Leu Val Arg Leu  
 100 105 110  
 Ala Ser Arg Ala Tyr Leu Glu Gly Phe Tyr Glu Lys Pro Arg Ile Asp  
 115 120 125  
 Arg Glu Ile Leu Arg Glu His Ala Glu Gly Leu Ile Ala Leu Ser Gly  
 130 135 140  
 Cys Leu Gly Ala Glu Ile Pro Gln Phe Ile Leu Gln Asp Arg Leu Asp  
 145 150 155 160  
 Leu Ala Glu Ala Arg Leu Asn Glu Tyr Leu Ser Ile Phe Lys Asp Arg  
 165 170 175  
 Phe Phe Ile Glu Ile Gln Asn His Gly Leu Pro Glu Gln Lys Lys Val  
 180 185 190  
 Asn Glu Val Leu Lys Glu Phe Ala Arg Lys Tyr Gly Leu Gly Met Val  
 195 200 205  
 Ala Thr Asn Asp Gly His Tyr Val Arg Lys Glu Asp Ala Arg Ala His  
 210 215 220  
 Glu Val Leu Leu Ala Ile Gln Ser Lys Ser Thr Leu Asp Asp Pro Gly  
 225 230 235 240  
 Ala Leu Ala Leu Pro Cys Glu Glu Phe Tyr Val Lys Thr Pro Glu Glu  
 245 250 255  
 Met Arg Ala Met Phe Pro Glu Glu Glu Val Gly Gly Arg Ser Pro Leu  
 260 265 270

Thr Thr Pro Trp Arg Ser Pro His Val Gln Arg Gly Ala Ala Ile Gly  
 275 280 285  
 Thr Arg Trp Ser Thr Arg Ile Pro Arg Phe Pro Leu Pro Glu Gly Arg  
 290 295 300  
 Thr Glu Ala Gln Tyr Leu Met Glu Leu Thr Phe Lys Gly Leu Leu Arg  
 305 310 315 320  
 Arg Tyr Pro Asp Arg Ile Thr Glu Gly Phe Tyr Arg Glu Val Phe Arg  
 325 330 335  
 Leu Ser Gly Lys Leu Pro Pro His Gly Asp Gly Glu Ala Leu Ala Glu  
 340 345 350  
 Ala Leu Ala Gln Val Glu Arg Glu Ala Trp Glu Arg Leu Met Lys Ser  
 355 360 365  
 Leu Pro Pro Leu Ala Gly Val Lys Glu Trp Thr Ala Glu Ala Ile Phe  
 370 375 380  
 His Arg Ala Leu Tyr Glu Leu Ser Ala Ile Glu Arg Met Gly Phe Pro  
 385 390 395 400  
 Gly Leu Leu Pro His Arg Pro Gly Leu His Gln Leu Gly Pro Glu Lys  
 405 410 415  
 Gly Val Ser Val Gly Pro Gly Arg Gly Gly Ala Ala Gly Ser Leu Val  
 420 425 430  
 Ala Tyr Ala Val Gly Ile Thr Asn Ile Asp Pro Leu Arg Phe Gly Leu  
 435 440 445  
 Leu Phe Glu Arg Phe Leu Asn Pro Glu Arg Val Ser Met Pro Asp Ile  
 450 455 460  
 Asp Thr Asp Phe Ser Asp Arg Glu Arg Asp Arg Val Ile Gln Tyr Val  
 465 470 475 480  
 Arg Glu Arg Tyr Gly Glu Asp Lys Val Ala Gln Ile Gly Thr Leu Gly  
 485 490 495  
 Ser Leu Ala Ser Lys Ala Ala Leu Lys Glu Val Ala Arg Val Tyr Gly  
 500 505 510  
 Ile Pro Arg Lys Lys Ala Glu Glu Leu Ala Lys Leu Ile Pro Val Gln  
 515 520 525

Phe Gly Lys Pro Lys Pro Leu Gln Glu Ala Ile Gln Val Val Pro Glu  
 530 535 540  
 Leu Arg Ala Glu Met Glu Lys Asp Pro Lys Val Arg Glu Val Leu Glu  
 545 550 555 560  
 Val Ala Met Arg Leu Glu Gly Leu Asn Arg His Ala Ser Val His Ala  
 565 570 575  
 Gly Arg Gly Gly Val Phe Ser Glu Pro Leu Thr Asp Leu Val Pro Leu  
 580 585 590  
 Cys Ala Thr Arg Lys Gly Gly Pro Tyr Thr Gln Tyr Asp Met Gly Ala  
 595 600 605  
 Val Glu Ala Leu Gly Leu Leu Lys Met Asp Phe Leu Gly Leu Arg Thr  
 610 615 620  
 Leu Thr Phe Leu Asp Glu Val Lys Arg Ile Val Lys Ala Ser Gln Gly  
 625 630 635 640  
 Val Glu Leu Asp Tyr Asp Ala Leu Pro Leu Asp Asp Pro Lys Thr Phe  
 645 650 655  
 Ala Leu Leu Ser Arg Gly Glu Thr Lys Gly Val Phe Gln Leu Glu Ser  
 660 665 670  
 Gly Gly Met Thr Ala Thr Leu Arg Gly Leu Lys Pro Arg Arg Phe Glu  
 675 680 685  
 Asp Leu Ile Ala Ile Leu Ser Leu Tyr Arg Pro Gly Pro Met Glu His  
 690 695 700  
 Ile Pro Thr Tyr Ile Arg Arg His His Gly Leu Glu Pro Val Ser Tyr  
 705 710 715 720  
 Ser Glu Phe Pro His Ala Glu Lys Tyr Leu Lys Pro Ile Leu Asp Glu  
 725 730 735  
 Thr Tyr Gly Ile Pro Val Tyr Gln Glu Gln Ile Met Gln Ile Ala Ser  
 740 745 750  
 Ala Val Ala Gly Tyr Ser Leu Gly Glu Ala Asp Leu Leu Arg Arg Ser  
 755 760 765  
 Met Gly Lys Lys Lys Val Glu Glu Met Lys Ser His Arg Glu Arg Phe  
 770 775 780

Val Gln Gly Ala Lys Glu Arg Gly Val Pro Glu Glu Glu Ala Asn Arg  
 785 790 795 800  
 Leu Phe Asp Met Leu Glu Ala Phe Ala Asn Tyr Gly Phe Asn Lys Ser  
 805 810 815  
 His Ala Ala Ala Tyr Ser Leu Leu Ser Tyr Gln Thr Ala Tyr Val Lys  
 820 825 830  
 Ala His Tyr Pro Val Glu Phe Met Ala Ala Leu Leu Ser Val Glu Arg  
 835 840 845  
 His Asp Ser Asp Lys Val Ala Glu Tyr Ile Arg Asp Ala Arg Ala Met  
 850 855 860  
 Gly Ile Glu Val Leu Pro Pro Asp Val Asn Arg Ser Gly Phe Asp Phe  
 865 870 875 880  
 Leu Val Gln Gly Arg Gln Ile Leu Phe Gly Leu Ser Ala Val Lys Asn  
 885 890 895  
 Val Gly Glu Ala Ala Ala Glu Ala Ile Leu Arg Glu Arg Glu Arg Gly  
 900 905 910  
 Gly Pro Tyr Arg Ser Leu Gly Asp Phe Leu Lys Arg Leu Asp Glu Lys  
 915 920 925  
 Val Leu Asn Lys Arg Thr Leu Glu Ser Leu Ile Lys Ala Gly Ala Leu  
 930 935 940  
 Asp Gly Phe Gly Glu Arg Ala Arg Leu Leu Ala Ser Leu Glu Gly Leu  
 945 950 955 960  
 Leu Lys Trp Ala Ala Glu Asn Arg Glu Lys Ala Arg Ser Gly Met Met  
 965 970 975  
 Gly Leu Phe Ser Glu Val Glu Glu Pro Pro Leu Ala Glu Ala Ala Pro  
 980 985 990  
 Leu Asp Glu Ile Thr Arg Leu Arg Tyr Glu Lys Glu Ala Leu Gly Ile  
 995 1000 1005  
 Tyr Val Ser Gly His Pro Ile Leu Arg Tyr Pro Gly Leu Arg Glu Thr  
 1010 1015 1020  
 Ala Thr Cys Thr Leu Glu Glu Leu Pro His Leu Ala Arg Asp Leu Pro  
 1025 1030 1035 1040

Pro Arg Ser Arg Val Leu Leu Ala Gly Met Val Glu Glu Val Val Arg  
1045 1050 1055

Lys Pro Thr Lys Ser Gly Gly Met Met Ala Arg Phe Val Leu Ser Asp  
1060 1065 1070

Glu Thr Gly Ala Leu Glu Ala Val Ala Phe Gly Arg Ala Tyr Asp Gln  
1075 1080 1085

Val Ser Pro Arg Leu Lys Glu Asp Thr Pro Val Leu Val Leu Ala Glu  
1090 1095 1100

Val Glu Arg Glu Glu Gly Gly Val Arg Val Leu Ala Gln Ala Val Trp  
1105 1110 1115 1120

Thr Tyr Gln Glu Leu Glu Gln Val Pro Arg Ala Leu Glu Val Glu Val  
1125 1130 1135

Glu Ala Ser Leu Pro Asp Asp Arg Gly Val Ala His Leu Lys Ser Leu  
1140 1145 1150

Leu Asp Glu His Ala Gly Thr Leu Pro Leu Tyr Val Arg Val Gln Gly  
1155 1160 1165

Ala Phe Gly Glu Ala Leu Leu Ala Leu Arg Glu Val Arg Val Gly Glu  
1170 1175 1180

Glu Ala Leu Gly Ala Leu Glu Ala Ala Gly Phe Pro Ala Tyr Leu Leu  
1185 1190 1195 1200

Pro Asn Arg Glu Val Ser Pro Arg Leu Thr Gly Ser Gly Gly Pro Arg  
1205 1210 1215

Gly Arg Ala Leu Ser Thr Gly Leu Ala Leu Lys Thr Tyr Pro Ile Ala  
1220 1225 1230

Leu Pro Gly Gly Asn Glu Ala Leu Ala Arg Pro Leu Leu  
1235 1240 1245

<210> 88

<211> 198

<212> PRT

<213> *Thermus thermophilus*

<400> 88

Val Glu Arg Val Val Arg Thr Leu Leu Asp Gly Arg Phe Leu Leu Glu  
1 5 10 15



Glu Gly Val Gly Leu Trp Glu Trp Arg Tyr Pro Phe Pro Leu Glu Gly  
                   20                                  25                                  30  
 Glu Ala Val Val Val Leu Asp Leu Glu Thr Thr Gly Leu Ala Gly Leu  
                   35                                  40                                  45  
 Asp Glu Val Ile Glu Val Gly Leu Leu Arg Leu Glu Gly Gly Arg Arg  
                   50                                  55                                  60  
 Leu Pro Phe Gln Ser Leu Val Arg Pro Leu Pro Pro Ala Glu Ala Arg  
                   65                                  70                                  75                                  80  
 Ser Trp Asn Leu Thr Gly Ile Pro Arg Glu Ala Leu Glu Glu Ala Pro  
                                   85                                  90                                  95  
 Ser Leu Glu Glu Val Leu Glu Lys Ala Tyr Pro Leu Arg Gly Asp Ala  
                                   100                                  105                                  110  
 Thr Leu Val Ile His Asn Ala Ala Phe Asp Leu Gly Phe Leu Arg Pro  
                   115                                  120                                  125  
 Ala Leu Glu Gly Leu Gly Tyr Arg Leu Glu Asn Pro Val Val Asp Ser  
                   130                                  135                                  140  
 Leu Arg Leu Ala Arg Arg Gly Leu Pro Gly Leu Arg Arg Tyr Gly Leu  
                   145                                  150                                  155                                  160  
 Asp Ala Leu Ser Glu Val Leu Glu Leu Pro Arg Arg Thr Cys His Arg  
                                   165                                  170                                  175  
 Ala Leu Glu Asp Val Glu Arg Thr Leu Ala Val Val His Glu Val Tyr  
                   180                                  185                                  190  
 Tyr Met Leu Thr Ser Gly  
                   195

<210> 89

<211> 182

<212> PRT

<213> *Deinococcus radiodurans*

<400> 89

Pro Trp Pro Gln Asp Val Val Val Phe Asp Leu Glu Thr Thr Gly Phe  
                   1                                  5                                  10                                  15

Ser Pro Ala Ser Ala Ala Ile Val Glu Ile Gly Ala Val Arg Ile Val

09716964.112100

20 25 30  
Gly Gly Gln Ile Asp Glu Thr Leu Lys Phe Glu Thr Leu Val Arg Pro  
35 40 45  
Thr Arg Pro Asp Gly Ser Met Leu Ser Ile Pro Trp Gln Ala Gln Arg  
50 55 60  
Val His Gly Ile Ser Asp Glu Met Val Arg Arg Ala Pro Ala Xaa Lys  
65 70 75 80  
Asp Val Leu Pro Asp Phe Phe Asp Phe Val Asp Gly Ser Ala Val Val  
85 90 95  
Ala His Asn Val Ser Phe Asp Gly Gly Phe Met Arg Ala Gly Ala Glu  
100 105 110  
Arg Leu Gly Leu Ser Trp Ala Pro Glu Arg Glu Leu Cys Thr Met Gln  
115 120 125  
Leu Ser Arg Arg Ala Phe Pro Arg Glu Arg Thr His Asn Leu Thr Val  
130 135 140  
Leu Ala Glu Arg Leu Gly Leu Glu Phe Ala Pro Gly Gly Arg His Arg  
145 150 155 160  
Ser Tyr Gly Asp Val Gln Val Thr Ala Gln Ala Tyr Leu Arg Leu Leu  
165 170 175  
Glu Leu Leu Gly Glu Arg  
180

<210> 90  
<211> 201  
<212> PRT  
<213> Bacillus subtilis

<400> 90  
His Gly Ile Lys Met Ile Tyr Gly Met Glu Ala Asn Leu Val Asp Asp  
1 5 10 15  
Gly Val Pro Ile Ala Tyr Asn Ala Ala His Arg Leu Leu Glu Glu Glu  
20 25 30  
Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val Tyr  
35 40 45

Asp Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Gly Gly Glu Ile  
 50 55 60  
 Ile Asp Lys Phe Glu Ala Phe Ala Asn Pro His Arg Pro Leu Ser Ala  
 65 70 75 80  
 Thr Ile Ile Glu Leu Thr Gly Ile Thr Asp Asp Met Leu Gln Asp Ala  
 85 90 95  
 Pro Asp Val Val Asp Val Ile Arg Asp Phe Arg Glu Trp Ile Gly Asp  
 100 105 110  
 Asp Ile Leu Val Ala His Asn Ala Ser Phe Asp Met Gly Phe Leu Asn  
 115 120 125  
 Val Ala Tyr Lys Lys Leu Leu Glu Val Glu Lys Ala Lys Asn Pro Val  
 130 135 140  
 Ile Asp Thr Leu Glu Leu Gly Arg Phe Leu Tyr Pro Glu Phe Lys Asn  
 145 150 155 160  
 His Arg Leu Asn Thr Leu Cys Lys Lys Phe Asp Ile Glu Leu Thr Gln  
 165 170 175  
 His His Arg Ala Ile Tyr Asp Thr Glu Ala Thr Ala Tyr Leu Leu Leu  
 180 185 190  
 Lys Met Leu Lys Asp Ala Ala Glu Lys  
 195 200

<210> 91  
 <211> 188  
 <212> PRT  
 <213> Haemophilus influenzae

<400> 91  
 Met Ile Asn Pro Asn Arg Gln Ile Val Leu Asp Thr Glu Thr Thr Gly  
 1 5 10 15  
 Met Asn Gln Leu Gly Ala His Tyr Glu Gly His Cys Ile Ile Glu Ile  
 20 25 30  
 Gly Ala Val Glu Leu Ile Asn Arg Arg Tyr Thr Gly Asn Asn Xaa His  
 35 40 45  
 Ile Tyr Ile Lys Pro Asp Arg Pro Xaa Asp Pro Asp Ala Ile Lys Val  
 50 55 60

His Gly Ile Thr Asp Glu Met Leu Ala Asp Lys Pro Glu Phe Lys Glu  
65 70 75 80

Val Ala Gln Asp Phe Leu Asp Tyr Ile Asn Gly Ala Glu Leu Leu Ile  
85 90 95

His Asn Ala Pro Phe Asp Val Gly Phe Met Asp Tyr Glu Phe Arg Lys  
100 105 110

Leu Asn Leu Asn Val Lys Thr Asp Asp Ile Cys Leu Val Thr Asp Thr  
115 120 125

Leu Gln Met Ala Arg Gln Met Tyr Pro Gly Lys Arg Asn Asn Leu Asp  
130 135 140

Ala Leu Cys Asp Arg Leu Gly Ile Asp Asn Ser Lys Arg Thr Leu His  
145 150 155 160

Gly Ala Leu Leu Asp Ala Glu Ile Leu Ala Asp Val Tyr Leu Met Met  
165 170 175

Thr Gly Gly Gln Thr Asn Leu Phe Asp Glu Glu Glu  
180 185

<210> 92

<211> 189

<212> PRT

<213> Escherichia coli

<400> 92

Met Ser Thr Ala Ile Thr Arg Gln Ile Val Leu Asp Thr Glu Thr Thr  
1 5 10 15

Gly Met Asn Gln Ile Gly Ala His Ser Glu Gly His Lys Ile Ile Glu  
20 25 30

Ile Gly Ala Val Glu Val Val Asn Arg Arg Leu Thr Gly Asn Asn Phe  
35 40 45

His Val Tyr Leu Lys Asp Arg Leu Val Asp Pro Glu Ala Phe Gly Val  
50 55 60

His Gly Ile Ala Val Asp Phe Leu Leu Asp Lys Pro Thr Phe Ala Glu  
65 70 75 80

Val Ala Val Glu Phe Met Asp Tyr Ile Arg Gly Ala Glu Leu Val Ile

85

90

95

His Asn Ala Ala Phe Asp Ile Gly Phe Met Asp Tyr Glu Phe Ser Leu  
 100 105 110

Leu Lys Arg Asp Ile Ala Lys Thr Asn Thr Phe Cys Lys Val Thr Asp  
 115 120 125

Ser Leu Ala Val Ala Arg Lys Met Phe Pro Gly Lys Arg Asn Ser Leu  
 130 135 140

Asp Ala Leu Cys Ala Arg Tyr Glu Ile Asp Asn Ser Lys Arg Thr Leu  
 145 150 155 160

His Gly Ala Leu Leu Asp Ala Gln Ile Leu Ala Glu Val Tyr Leu Ala  
 165 170 175

Met Thr Gly Gly Gln Thr Ser Met Ala Phe Ala Met Glu  
 180 185

<210> 93

<211> 201

<212> PRT

<213> Helicobacter pylori

<400> 93

Asn Leu Glu Tyr Leu Lys Ala Cys Gly Leu Asn Phe Ile Glu Thr Ser  
 1 5 10 15

Glu Asn Leu Ile Thr Leu Lys Asn Leu Lys Thr Pro Leu Lys Asp Glu  
 20 25 30

Val Phe Ser Phe Ile Asp Leu Glu Thr Thr Gly Ser Cys Pro Ile Lys  
 35 40 45

His Glu Ile Leu Glu Ile Gly Ala Val Gln Val Lys Gly Gly Glu Ile  
 50 55 60

Ile Asn Arg Phe Glu Thr Leu Val Lys Val Lys Ser Val Pro Asp Tyr  
 65 70 75 80

Ile Ala Glu Leu Thr Gly Ile Thr Tyr Glu Asp Thr Leu Asn Ala Pro  
 85 90 95

Ser Ala His Glu Ala Leu Gln Glu Leu Arg Leu Phe Leu Gly Asn Ser  
 100 105 110

Val Phe Val Ala His Asn Ala Asn Phe Asp Tyr Asn Phe Leu Gly Arg  
115 120 125

Tyr Phe Val Glu Lys Leu His Cys Pro Leu Leu Asn Leu Lys Leu Cys  
130 135 140

Thr Leu Asp Leu Ser Lys Arg Ala Ile Leu Ser Met Arg Tyr Ser Leu  
145 150 155 160

Ser Phe Leu Lys Glu Leu Leu Gly Phe Gly Ile Glu Val Ser His Arg  
165 170 175

Ala Tyr Ala Asp Ala Leu Ala Ser Tyr Lys Leu Phe Glu Ile Cys Leu  
180 185 190

Leu Asn Leu Pro Ser Tyr Ile Lys Thr  
195 200

<210> 94  
<211> 630  
<212> DNA  
<213> Thermus thermophilus

<400> 94  
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ctggagacca cggggcttgc cggcctggac gaggtgattg aggtgggcct cctccgcctg 180  
gaggggggga ggcgcctccc cttccagagc ctgctcggc ccctcccgc cgccgaagcc 240  
cgttcgtgga acctcaccgg catcccccg gaggccttg aggaggcccc ctccctggag 300  
gaggttcttg agaaggccta cccctccgc ggcgacgcca ccttggtgat ccacaacgcc 360  
gcctttgacc tgggcttctt cgcgccggcc ttggaggggc tgggctaccg cctggaaaac 420  
cccgtggtgg actccctgcg cttggccaga cggggcttac caggccttag gcgctacggc 480  
ctggacgccc tctccgaggt cctggagctt ccccgaagga cctgccaccg ggccctcgag 540  
gacgtggagc gcaccctcgc cgtggtgcac gaggtatact atatgcttac gtccggccgt 600  
ccccgcacgc tttgggaact cgggaggtag 630

<210> 95  
<211> 210  
<212> PRT  
<213> Thermus thermophilus

<400> 95  
Met Val Glu Arg Val Val Arg Thr Leu Leu Asp Gly Arg Phe Leu Leu  
1 5 10 15

Glu Glu Gly Val Gly Leu Trp Glu Trp Arg Tyr Pro Phe Pro Leu Glu

20

25

30

Gly Glu Ala Val Val Val Leu Asp Leu Glu Thr Thr Gly Leu Ala Gly  
 35 40 45

Leu Asp Glu Val Ile Glu Val Gly Leu Leu Arg Leu Glu Gly Gly Arg  
 50 55 60

Arg Leu Pro Phe Gln Ser Leu Val Arg Pro Leu Pro Pro Ala Glu Ala  
 65 70 75 80

Arg Ser Trp Asn Leu Thr Gly Ile Pro Arg Glu Ala Leu Glu Glu Ala  
 85 90 95

Pro Ser Leu Glu Glu Val Leu Glu Lys Ala Tyr Pro Leu Arg Gly Asp  
 100 105 110

Ala Thr Leu Val Ile His Asn Ala Ala Phe Asp Leu Gly Phe Leu Arg  
 115 120 125

Pro Ala Leu Glu Gly Leu Gly Tyr Arg Leu Glu Asn Pro Val Val Asp  
 130 135 140

Ser Leu Arg Leu Ala Arg Arg Gly Leu Pro Gly Leu Arg Arg Tyr Gly  
 145 150 155 160

Leu Asp Ala Leu Ser Glu Val Leu Glu Leu Pro Arg Arg Thr Cys His  
 165 170 175

Arg Ala Leu Glu Asp Val Glu Arg Thr Leu Ala Val Val His Glu Val  
 180 185 190

Tyr Tyr Met Leu Thr Ser Gly Arg Pro Arg Thr Leu Trp Glu Leu Gly  
 195 200 205

Arg Glx  
 210

<210> 96

<211> 461

<212> PRT

<213> *Pseudomonas marcesans*

<400> 96

Met Leu Glu Ala Ser Trp Glu Lys Val Gln Ser Ser Leu Lys Gln Asn  
 1 5 10 15

Leu Ser Lys Pro Ser Tyr Glu Thr Trp Ile Arg Pro Thr Glu Phe Ser  
 20 25 30  
 Gly Phe Lys Asn Gly Glu Leu Thr Leu Ile Ala Pro Asn Ser Phe Ser  
 35 40 45  
 Ser Ala Trp Leu Lys Asn Asn Tyr Ser Gln Thr Ile Gln Glu Thr Ala  
 50 55 60  
 Glu Glu Ile Phe Gly Glu Pro Val Thr Val His Val Lys Val Lys Ala  
 65 70 75 80  
 Asn Ala Glu Ser Ser Asp Glu His Tyr Ser Ser Ala Pro Ile Thr Pro  
 85 90 95  
 Pro Leu Glu Ala Ser Pro Gly Ser Val Asp Ser Ser Gly Ser Ser Leu  
 100 105 110  
 Arg Leu Ser Lys Lys Thr Leu Pro Leu Leu Asn Leu Arg Tyr Val Phe  
 115 120 125  
 Asn Arg Phe Val Val Gly Pro Asn Ser Arg Met Ala His Ala Ala Ala  
 130 135 140  
 Met Ala Val Ala Glu Ser Pro Gly Arg Glu Phe Asn Pro Leu Phe Ile  
 145 150 155 160  
 Cys Gly Gly Val Gly Leu Gly Lys Thr His Leu Met Gln Ala Ile Gly  
 165 170 175  
 His Tyr Arg Leu Glu Ile Asp Pro Gly Ala Lys Val Ser Tyr Val Ser  
 180 185 190  
 Thr Glu Thr Phe Thr Asn Asp Leu Ile Leu Ala Ile Arg Gln Asp Arg  
 195 200 205  
 Met Gln Ala Phe Arg Asp Arg Tyr Arg Ala Ala Asp Leu Ile Leu Val  
 210 215 220  
 Asp Asp Ile Gln Phe Ile Glu Gly Lys Glu Tyr Thr Gln Glu Glu Phe  
 225 230 235 240  
 Phe His Thr Phe Asn Ala Leu His Asp Ala Gly Ser Gln Ile Val Leu  
 245 250 255  
 Ala Ser Asp Arg Pro Pro Ser Gln Ile Pro Arg Leu Gln Glu Arg Leu  
 260 265 270



Met Ser Arg Phe Ser Met Gly Leu Ile Ala Asp Val Gln Ala Pro Asp  
 275 280 285  
 Leu Glu Thr Arg Met Ala Ile Leu Gln Lys Lys Ala Glu His Glu Arg  
 290 295 300  
 Val Gly Leu Pro Arg Asp Leu Ile Gln Phe Ile Ala Gly Arg Phe Thr  
 305 310 315 320  
 Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Thr Arg Ala Ile Ala Phe  
 325 330 335  
 Ala Ser Ile Thr Gly Leu Pro Met Thr Val Asp Ser Ile Ala Pro Met  
 340 345 350  
 Leu Asp Pro Asn Gly Gln Gly Val Glu Val Thr Pro Lys Gln Val Leu  
 355 360 365  
 Asp Lys Val Ala Glu Val Phe Lys Val Thr Pro Asp Glu Met Arg Ser  
 370 375 380  
 Ala Ser Arg Arg Arg Pro Val Ser Gln Ala Arg Gln Val Gly Met Tyr  
 385 390 395 400  
 Leu Met Arg Gln Gly Thr Asn Leu Ser Leu Pro Arg Ile Gly Asp Thr  
 405 410 415  
 Phe Gly Gly Lys Asp His Thr Thr Val Met Tyr Ala Ile Glu Gln Val  
 420 425 430  
 Glu Lys Lys Leu Ser Ser Asp Pro Gln Ile Ala Ser Gln Val Gln Lys  
 435 440 445  
 Ile Arg Asp Leu Leu Gln Ile Asp Ser Arg Arg Lys Arg  
 450 455 460

<210> 97

<211> 447

<212> PRT

<213> Synechocystis sp.

<400> 97

Met Val Ser Cys Glu Asn Leu Trp Gln Gln Ala Leu Ala Ile Leu Ala  
 1 5 10 15

Thr Gln Leu Thr Lys Pro Ala Phe Asp Thr Trp Ile Lys Ala Ser Val  
 20 25 30

Leu Ile Ser Leu Gly Asp Gly Val Ala Thr Ile Gln Val Glu Asn Gly  
 35 40 45  
 Phe Val Leu Asn His Leu Gln Lys Ser Tyr Gly Pro Leu Leu Met Glu  
 50 55 60  
 Val Leu Thr Asp Leu Thr Gly Gln Glu Ile Thr Val Lys Leu Ile Thr  
 65 70 75 80  
 Asp Gly Leu Glu Pro His Ser Leu Ile Gly Gln Glu Ser Ser Leu Pro  
 85 90 95  
 Met Glu Thr Thr Pro Lys Asn Ala Thr Ala Leu Asn Gly Lys Tyr Thr  
 100 105 110  
 Phe Ser Arg Phe Val Val Gly Pro Thr Asn Arg Met Ala His Ala Ala  
 115 120 125  
 Ser Leu Ala Val Ala Glu Ser Pro Gly Arg Glu Phe Asn Pro Leu Phe  
 130 135 140  
 Leu Cys Gly Gly Val Gly Leu Gly Lys Thr His Leu Met Gln Ala Ile  
 145 150 155 160  
 Ala His Tyr Arg Leu Glu Met Tyr Pro Asn Ala Lys Val Tyr Tyr Val  
 165 170 175  
 Ser Thr Glu Arg Phe Thr Asn Asp Leu Ile Thr Ala Ile Arg Gln Asp  
 180 185 190  
 Asn Met Glu Asp Phe Arg Ser Tyr Tyr Arg Ser Ala Asp Phe Leu Leu  
 195 200 205  
 Ile Asp Asp Ile Gln Phe Ile Lys Gly Lys Glu Tyr Thr Gln Glu Glu  
 210 215 220  
 Phe Phe His Thr Phe Asn Ser Leu His Glu Ala Gly Lys Gln Val Val  
 225 230 235 240  
 Val Ala Ser Asp Arg Ala Pro Gln Arg Ile Pro Gly Leu Gln Asp Arg  
 245 250 255  
 Leu Ile Ser Arg Phe Ser Met Gly Leu Ile Ala Asp Ile Gln Val Pro  
 260 265 270  
 Asp Leu Glu Thr Arg Met Ala Ile Leu Gln Lys Lys Ala Glu Tyr Asp  
 275 280 285

Arg Ile Arg Leu Pro Lys Glu Val Ile Glu Tyr Ile Ala Ser His Tyr  
 290 295 300

Thr Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Ile Arg Ala Ile Ala  
 305 310 315 320

Tyr Thr Ser Leu Ser Asn Val Ala Met Thr Val Glu Asn Ile Ala Pro  
 325 330 335

Val Leu Asn Pro Pro Val Glu Lys Val Ala Ala Ala Pro Glu Thr Ile  
 340 345 350

Ile Thr Ile Val Ala Gln His Tyr Gln Leu Lys Val Glu Glu Leu Leu  
 355 360 365

Ser Asn Ser Arg Arg Arg Glu Val Ser Leu Ala Arg Gln Val Gly Met  
 370 375 380

Tyr Leu Met Arg Gln His Thr Asp Leu Ser Leu Pro Arg Ile Gly Glu  
 385 390 395 400

Ala Phe Gly Gly Lys Asp His Thr Thr Val Met Tyr Ser Cys Asp Lys  
 405 410 415

Ile Thr Gln Leu Gln Gln Lys Asp Trp Glu Thr Ser Gln Thr Leu Thr  
 420 425 430

Ser Leu Ser His Arg Ile Asn Ile Ala Gly Gln Ala Pro Glu Ser  
 435 440 445

<210> 98

<211> 446

<212> PRT

<213> Bacillus subtilis

<400> 98

Met Glu Asn Ile Leu Asp Leu Trp Asn Gln Ala Leu Ala Gln Ile Glu  
 1 5 10 15

Lys Lys Leu Ser Lys Pro Ser Phe Glu Thr Trp Met Lys Ser Thr Lys  
 20 25 30

Ala His Ser Leu Gln Gly Asp Thr Leu Thr Ile Thr Ala Pro Asn Glu  
 35 40 45

Phe Ala Arg Asp Trp Leu Glu Ser Arg Tyr Leu His Leu Ile Ala Asp

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50		55		60
Thr Ile Tyr Glu Leu Thr Gly Glu Glu Leu Ser Ile Lys Phe Val Ile				
65		70		75
				80
Pro Gln Asn Gln Asp Val Glu Asp Phe Met Pro Lys Pro Gln Val Lys				
	85		90	95
Lys Ala Val Lys Glu Asp Thr Ser Asp Phe Pro Gln Asn Met Leu Asn				
	100		105	110
Pro Lys Tyr Thr Phe Asp Thr Phe Val Ile Gly Ser Gly Asn Arg Phe				
	115		120	125
Ala His Ala Ala Ser Leu Ala Val Ala Glu Ala Pro Ala Lys Ala Tyr				
	130		135	140
Asn Pro Leu Phe Ile Tyr Gly Gly Val Gly Leu Gly Lys Thr His Leu				
145		150		155
				160
Met His Ala Ile Gly His Tyr Val Ile Asp His Asn Pro Ser Ala Lys				
	165		170	175
Val Val Tyr Leu Ser Ser Glu Lys Phe Thr Asn Glu Phe Ile Asn Ser				
	180		185	190
Ile Arg Asp Asn Lys Ala Val Asp Phe Arg Asn Arg Tyr Arg Asn Val				
	195		200	205
Asp Val Leu Leu Ile Asp Asp Ile Gln Phe Leu Ala Gly Lys Glu Gln				
	210		215	220
Thr Gln Glu Glu Phe Phe His Thr Phe Asn Thr Leu His Glu Glu Ser				
225		230		235
				240
Lys Gln Ile Val Ile Ser Ser Asp Arg Pro Pro Lys Glu Ile Pro Thr				
	245		250	255
Leu Glu Asp Arg Leu Arg Ser Arg Phe Glu Trp Gly Leu Ile Thr Asp				
	260		265	270
Ile Thr Pro Pro Asp Leu Glu Thr Arg Ile Ala Ile Leu Arg Lys Lys				
	275		280	285
Ala Lys Ala Glu Gly Leu Asp Ile Pro Asn Glu Val Met Leu Tyr Ile				
	290		295	300
Ala Asn Gln Ile Asp Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Ile				

305                      310                      315                      320  
 Arg Val Val Ala Tyr Ser Ser Leu Ile Asn Lys Asp Ile Asn Ala Asp  
                                  325                      330                      335  
 Leu Ala Ala Glu Ala Leu Lys Asp Ile Ile Pro Ser Ser Lys Pro Lys  
                                  340                      345                      350  
 Val Ile Thr Ile Lys Glu Ile Gln Arg Val Val Gly Gln Gln Phe Asn  
                                  355                      360                      365  
 Ile Lys Leu Glu Asp Phe Lys Ala Lys Lys Arg Thr Lys Ser Val Ala  
                                  370                      375                      380  
 Phe Pro Arg Gln Ile Ala Met Tyr Leu Ser Arg Glu Met Thr Asp Ser  
 385                      390                      395                      400  
 Ser Leu Pro Lys Ile Gly Glu Glu Phe Gly Gly Arg Asp His Thr Thr  
                                  405                      410                      415  
 Val Ile His Ala His Glu Lys Ile Ser Lys Leu Leu Ala Asp Asp Glu  
                                  420                      425                      430  
 Gln Leu Gln Gln His Val Lys Glu Ile Lys Glu Gln Leu Lys  
                                  435                      440                      445  
  
 <210> 99  
 <211> 507  
 <212> PRT  
 <213> Mycobacterium tuberculosis  
  
 <400> 99  
 Met Thr Asp Asp Pro Gly Ser Gly Phe Thr Thr Val Trp Asn Ala Val  
   1                      5                      10                      15  
 Val Ser Glu Leu Asn Gly Asp Pro Lys Val Asp Asp Gly Pro Ser Ser  
                                  20                      25                      30  
 Asp Ala Asn Leu Ser Ala Pro Leu Thr Pro Gln Gln Arg Ala Trp Leu  
                                  35                      40                      45  
 Asn Leu Val Gln Pro Leu Thr Ile Val Glu Gly Phe Ala Leu Leu Ser  
                                  50                      55                      60  
 Val Pro Ser Ser Phe Val Gln Asn Glu Ile Glu Arg His Leu Arg Ala  
   65                      70                      75                      80

Pro Ile Thr Asp Ala Leu Ser Arg Arg Leu Gly His Gln Ile Gln Leu  
                     85                    90                    95  
 Gly Val Arg Ile Ala Pro Pro Ala Thr Asp Glu Ala Asp Asp Thr Thr  
                     100                    105                    110  
 Val Pro Pro Ser Glu Asn Pro Ala Thr Thr Ser Pro Asp Thr Thr Thr  
                     115                    120                    125  
 Asp Asn Asp Glu Ile Asp Asp Ser Ala Ala Ala Arg Gly Asp Asn Gln  
                     130                    135                    140  
 His Ser Trp Pro Ser Tyr Phe Thr Glu Arg Pro His Asn Thr Asp Ser  
 145                    150                    155                    160  
 Ala Thr Ala Gly Val Thr Ser Leu Asn Arg Arg Tyr Thr Phe Asp Thr  
                     165                    170                    175  
 Phe Val Ile Gly Ala Ser Asn Arg Phe Ala His Ala Ala Ala Leu Ala  
                     180                    185                    190  
 Ile Ala Glu Ala Pro Ala Arg Ala Tyr Asn Pro Leu Phe Ile Trp Gly  
                     195                    200                    205  
 Glu Ser Gly Leu Gly Lys Thr His Leu Leu His Ala Ala Gly Asn Tyr  
                     210                    215                    220  
 Ala Gln Arg Leu Phe Pro Gly Met Arg Val Lys Tyr Val Ser Thr Glu  
 225                    230                    235                    240  
 Glu Phe Thr Asn Asp Phe Ile Asn Ser Leu Arg Asp Asp Arg Lys Val  
                     245                    250                    255  
 Ala Phe Lys Arg Ser Tyr Arg Asp Val Asp Val Leu Leu Val Asp Asp  
                     260                    265                    270  
 Ile Gln Phe Ile Glu Gly Lys Glu Gly Ile Gln Glu Glu Phe Phe His  
                     275                    280                    285  
 Thr Phe Asn Thr Leu His Asn Ala Asn Lys Gln Ile Val Ile Ser Ser  
                     290                    295                    300  
 Asp Arg Pro Pro Lys Gln Leu Ala Thr Leu Glu Asp Arg Leu Arg Thr  
 305                    310                    315                    320  
 Arg Phe Glu Trp Gly Leu Ile Thr Asp Val Gln Pro Pro Glu Leu Glu  
                     325                    330                    335

Thr Arg Ile Ala Ile Leu Arg Lys Lys Ala Gln Met Glu Arg Leu Ala  
 340 345 350  
 Val Pro Asp Asp Val Leu Glu Leu Ile Ala Ser Ser Ile Glu Arg Asn  
 355 360 365  
 Ile Arg Glu Leu Glu Gly Ala Leu Ile Arg Val Thr Ala Phe Ala Ser  
 370 375 380  
 Leu Asn Lys Thr Pro Ile Asp Lys Ala Leu Ala Glu Ile Val Leu Arg  
 385 390 395 400  
 Asp Leu Ile Ala Asp Ala Asn Thr Met Gln Ile Ser Ala Ala Thr Ile  
 405 410 415  
 Met Ala Ala Thr Ala Glu Tyr Phe Asp Thr Thr Val Glu Glu Leu Arg  
 420 425 430  
 Gly Pro Gly Lys Thr Arg Ala Leu Ala Gln Ser Arg Gln Ile Ala Met  
 435 440 445  
 Tyr Leu Cys Arg Glu Leu Thr Asp Leu Ser Leu Pro Lys Ile Gly Gln  
 450 455 460  
 Ala Phe Gly Arg Asp His Thr Thr Val Met Tyr Ala Gln Arg Lys Ile  
 465 470 475 480  
 Leu Ser Glu Met Ala Glu Arg Arg Glu Val Phe Asp His Val Lys Glu  
 485 490 495  
 Leu Thr Thr Arg Ile Arg Gln Arg Ser Lys Arg  
 500 505

<210> 100

<211> 446

<212> PRT

<213> *Thermus thermophilus*

<400> 100

Met Ser His Glu Ala Val Trp Gln His Val Leu Glu His Ile Arg Arg  
 1 5 10 15

Ser Ile Thr Glu Val Glu Phe His Thr Trp Phe Glu Arg Ile Arg Pro  
 20 25 30

Leu Gly Ile Arg Asp Gly Val Leu Glu Leu Ala Val Pro Thr Ser Phe  
 35 40 45

Ala Leu Asp Trp Ile Arg Arg His Tyr Ala Gly Leu Ile Gln Glu Gly  
 50 55 60  
 Pro Arg Leu Leu Gly Ala Gln Ala Pro Arg Phe Glu Leu Arg Val Val  
 65 70 75 80  
 Pro Gly Val Val Val Gln Glu Asp Ile Phe Gln Pro Pro Pro Ser Pro  
 85 90 95  
 Pro Ala Gln Ala Gln Pro Glu Asp Thr Phe Lys Thr Ser Trp Trp Gly  
 100 105 110  
 Pro Thr Thr Pro Trp Pro His Gly Gly Ala Val Ala Val Ala Glu Ser  
 115 120 125  
 Pro Gly Arg Ala Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Arg Gly Leu  
 130 135 140  
 Gly Lys Thr Tyr Leu Met His Ala Val Gly Pro Leu Arg Ala Lys Arg  
 145 150 155 160  
 Phe Pro His Met Arg Leu Glu Tyr Val Ser Thr Glu Thr Phe Thr Asn  
 165 170 175  
 Glu Leu Ile Asn Arg Pro Ser Ala Arg Asp Arg Met Thr Glu Phe Arg  
 180 185 190  
 Glu Arg Tyr Arg Ser Val Asp Leu Leu Leu Val Asp Asp Val Gln Phe  
 195 200 205  
 Ile Ala Gly Lys Glu Arg Thr Gln Glu Glu Phe Phe His Thr Phe Asn  
 210 215 220  
 Ala Leu Tyr Glu Ala His Lys Gln Ile Ile Leu Ser Ser Asp Arg Pro  
 225 230 235 240  
 Pro Lys Asp Ile Leu Thr Leu Glu Ala Arg Leu Arg Ser Arg Phe Glu  
 245 250 255  
 Trp Gly Leu Ile Thr Asp Asn Pro Ala Pro Asp Leu Glu Thr Arg Ile  
 260 265 270  
 Ala Ile Leu Lys Met Asn Ala Ser Ser Gly Pro Glu Asp Pro Glu Asp  
 275 280 285  
 Ala Leu Glu Tyr Ile Ala Arg Gln Val Thr Ser Asn Ile Arg Glu Trp  
 290 295 300



Glu Gly Ala Leu Met Arg Ala Ser Pro Phe Ala Ser Leu Asn Gly Val  
 305 310 315 320

Glu Leu Thr Arg Ala Val Ala Ala Lys Ala Leu Arg His Leu Arg Pro  
 325 330 335

Arg Glu Leu Glu Ala Asp Pro Leu Glu Ile Ile Arg Lys Ala Ala Gly  
 340 345 350

Pro Val Arg Pro Glu Thr Pro Gly Gly Ala His Gly Glu Arg Arg Lys  
 355 360 365

Lys Glu Val Val Leu Pro Arg Gln Leu Ala Met Tyr Leu Val Arg Glu  
 370 375 380

Leu Thr Pro Ala Ser Leu Pro Glu Ile Gly Gln Leu Phe Gly Gly Arg  
 385 390 395 400

Asp His Thr Thr Val Arg Tyr Ala Ile Gln Lys Val Gln Glu Leu Ala  
 405 410 415

Gly Lys Pro Asp Arg Glu Val Gln Gly Leu Leu Arg Thr Leu Arg Glu  
 420 425 430

Ala Cys Thr Asp Pro Val Asp Asn Leu Trp Ile Thr Cys Gly  
 435 440 445

<210> 101

<211> 467

<212> PRT

<213> Escherichia coli

<400> 101

Met Ser Leu Ser Leu Trp Gln Gln Cys Leu Ala Arg Leu Gln Asp Glu  
 1 5 10 15

Leu Pro Ala Thr Glu Phe Ser Met Trp Ile Arg Pro Leu Gln Ala Glu  
 20 25 30

Leu Ser Asp Asn Thr Leu Ala Leu Tyr Ala Pro Asn Arg Phe Val Leu  
 35 40 45

Asp Trp Val Arg Asp Lys Tyr Leu Asn Asn Ile Asn Gly Leu Leu Thr  
 50 55 60

Ser Phe Cys Gly Ala Asp Ala Pro Gln Leu Arg Phe Glu Val Gly Thr

65		70		75		80									
Lys	Pro	Val	Thr	Gln	Thr	Pro	Gln	Ala	Ala	Val	Thr	Ser	Asn	Val	Ala
				85					90					95	
Ala	Pro	Ala	Gln	Val	Ala	Gln	Thr	Gln	Pro	Gln	Arg	Ala	Ala	Pro	Ser
			100					105						110	
Thr	Arg	Ser	Gly	Trp	Asp	Asn	Val	Pro	Ala	Pro	Ala	Glu	Pro	Thr	Tyr
			115				120					125			
Arg	Ser	Asn	Val	Asn	Val	Lys	His	Thr	Phe	Asp	Asn	Phe	Val	Glu	Gly
			130				135					140			
Lys	Ser	Asn	Gln	Leu	Ala	Arg	Ala	Ala	Ala	Arg	Gln	Val	Ala	Asp	Asn
145					150					155					160
Pro	Gly	Gly	Ala	Tyr	Asn	Pro	Leu	Phe	Leu	Tyr	Gly	Gly	Thr	Gly	Leu
				165					170					175	
Gly	Lys	Thr	His	Leu	Leu	His	Ala	Val	Gly	Asn	Gly	Ile	Met	Ala	Arg
			180					185					190		
Lys	Pro	Asn	Ala	Lys	Val	Val	Tyr	Met	His	Ser	Glu	Arg	Phe	Val	Gln
			195					200					205		
Asp	Met	Val	Lys	Ala	Leu	Gln	Asn	Asn	Ala	Ile	Glu	Glu	Phe	Lys	Arg
			210				215				220				
Tyr	Tyr	Arg	Ser	Val	Asp	Ala	Leu	Leu	Ile	Asp	Asp	Ile	Gln	Phe	Phe
225					230					235					240
Ala	Asn	Lys	Glu	Arg	Ser	Gln	Glu	Glu	Phe	Phe	His	Thr	Phe	Asn	Ala
				245					250					255	
Leu	Leu	Glu	Gly	Asn	Gln	Gln	Ile	Ile	Leu	Thr	Ser	Asp	Arg	Tyr	Pro
			260					265					270		
Lys	Glu	Ile	Asn	Gly	Val	Glu	Asp	Arg	Leu	Lys	Ser	Arg	Phe	Gly	Trp
			275				280					285			
Gly	Leu	Thr	Val	Ala	Ile	Glu	Pro	Pro	Glu	Leu	Glu	Thr	Arg	Val	Ala
			290			295					300				
Ile	Leu	Met	Lys	Lys	Ala	Asp	Glu	Asn	Asp	Ile	Arg	Leu	Pro	Gly	Glu
305					310					315				320	
Val	Ala	Phe	Phe	Ile	Ala	Lys	Arg	Leu	Arg	Ser	Asn	Val	Arg	Glu	Leu

325

330

335

Glu Gly Ala Leu Asn Arg Val Ile Ala Asn Ala Asn Phe Thr Gly Arg  
 340 345 350

Ala Ile Thr Ile Asp Phe Val Arg Glu Ala Leu Arg Asp Leu Leu Ala  
 355 360 365

Leu Gln Glu Lys Leu Val Thr Ile Asp Asn Ile Gln Lys Thr Val Ala  
 370 375 380

Glu Tyr Tyr Lys Ile Lys Val Ala Asp Leu Leu Ser Lys Arg Arg Ser  
 385 390 395 400

Arg Ser Val Ala Arg Pro Arg Gln Met Ala Met Ala Leu Ala Lys Glu  
 405 410 415

Leu Thr Asn His Ser Leu Pro Glu Ile Gly Asp Ala Phe Gly Gly Arg  
 420 425 430

Asp His Thr Thr Val Leu His Ala Cys Arg Lys Ile Glu Gln Leu Arg  
 435 440 445

Glu Glu Ser His Asp Ile Lys Glu Asp Phe Ser Asn Leu Ile Arg Thr  
 450 455 460

Leu Ser Ser  
 465

<210> 102

<211> 440

<212> PRT

<213> *Thermatoga maritima*

<400> 102

Met Lys Glu Arg Ile Leu Gln Glu Ile Lys Thr Arg Val Asn Arg Lys  
 1 5 10 15

Ser Trp Glu Leu Trp Phe Ser Ser Phe Asp Val Lys Ser Ile Glu Gly  
 20 25 30

Asn Lys Val Val Phe Ser Val Gly Asn Leu Phe Ile Lys Glu Trp Leu  
 35 40 45

Glu Lys Lys Tyr Tyr Ser Val Leu Ser Lys Ala Val Lys Val Val Leu  
 50 55 60

Gly	Asn	Asp	Ala	Thr	Phe	Glu	Ile	Thr	Tyr	Glu	Ala	Phe	Glu	Pro	His	65	70	75	80
Ser	Ser	Tyr	Ser	Glu	Pro	Leu	Val	Lys	Lys	Arg	Ala	Val	Leu	Leu	Thr	85	90	95	
Pro	Leu	Asn	Pro	Asp	Tyr	Thr	Phe	Glu	Asn	Phe	Val	Val	Gly	Pro	Gly	100	105	110	
Asn	Ser	Phe	Ala	Tyr	His	Ala	Ala	Leu	Glu	Val	Ala	Lys	His	Pro	Gly	115	120	125	
Arg	Tyr	Asn	Pro	Leu	Phe	Ile	Tyr	Gly	Gly	Val	Gly	Leu	Gly	Lys	Thr	130	135	140	
His	Leu	Leu	Gln	Ser	Ile	Gly	Asn	Tyr	Val	Val	Gln	Asn	Glu	Pro	Asp	145	150	155	160
Leu	Arg	Val	Met	Tyr	Ile	Thr	Ser	Glu	Lys	Phe	Leu	Asn	Asp	Leu	Val	165	170	175	
Asp	Ser	Met	Lys	Glu	Gly	Lys	Leu	Asn	Glu	Phe	Arg	Glu	Lys	Tyr	Arg	180	185	190	
Lys	Lys	Val	Asp	Ile	Leu	Leu	Ile	Asp	Asp	Val	Gln	Phe	Leu	Ile	Gly	195	200	205	
Lys	Thr	Gly	Val	Gln	Thr	Glu	Leu	Phe	His	Thr	Phe	Asn	Glu	Leu	His	210	215	220	
Asp	Ser	Gly	Lys	Gln	Ile	Val	Ile	Cys	Ser	Asp	Arg	Glu	Pro	Gln	Lys	225	230	235	240
Leu	Ser	Glu	Phe	Gln	Asp	Arg	Leu	Val	Ser	Arg	Phe	Gln	Met	Gly	Leu	245	250	255	
Val	Ala	Lys	Leu	Glu	Pro	Pro	Asp	Glu	Glu	Thr	Arg	Lys	Ser	Ile	Ala	260	265	270	
Arg	Lys	Met	Leu	Glu	Ile	Glu	His	Gly	Glu	Leu	Pro	Glu	Glu	Val	Leu	275	280	285	
Asn	Phe	Val	Ala	Glu	Asn	Val	Asp	Asp	Asn	Leu	Arg	Arg	Leu	Arg	Gly	290	295	300	
Ala	Ile	Ile	Lys	Leu	Leu	Val	Tyr	Lys	Glu	Thr	Thr	Gly	Lys	Glu	Val	305	310	315	320

Asp Leu Lys Glu Ala Ile Leu Leu Leu Lys Asp Phe Ile Lys Pro Asn  
 325 330 335  
 Arg Val Lys Ala Met Asp Pro Ile Asp Glu Leu Ile Glu Ile Val Ala  
 340 345 350  
 Lys Val Thr Gly Val Pro Arg Glu Glu Ile Leu Ser Asn Ser Arg Asn  
 355 360 365  
 Val Lys Ala Leu Thr Ala Arg Arg Ile Gly Met Tyr Val Ala Lys Asn  
 370 375 380  
 Tyr Leu Lys Ser Ser Leu Arg Thr Ile Ala Glu Lys Phe Asn Arg Ser  
 385 390 395 400  
 His Pro Val Val Val Asp Ser Val Lys Lys Val Lys Asp Ser Leu Leu  
 405 410 415  
 Lys Gly Asn Lys Gln Leu Lys Ala Leu Ile Asp Glu Val Ile Gly Glu  
 420 425 430  
 Ile Ser Arg Arg Ala Leu Ser Gly  
 435 440

<210> 103

<211> 457

<212> PRT

<213> Helicobacter pylori

<400> 103

Met Asp Thr Asn Asn Asn Ile Glu Lys Glu Ile Leu Ala Leu Val Lys  
 1 5 10 15  
 Gln Asn Pro Lys Val Ser Leu Ile Glu Tyr Glu Asn Tyr Phe Ser Gln  
 20 25 30  
 Leu Lys Tyr Asn Pro Asn Ala Ser Lys Ser Asp Ile Ala Phe Phe Tyr  
 35 40 45  
 Ala Pro Asn Gln Val Leu Cys Thr Thr Ile Thr Ala Lys Tyr Gly Ala  
 50 55 60  
 Leu Leu Lys Glu Ile Leu Ser Gln Asn Lys Val Gly Met His Leu Ala  
 65 70 75 80  
 His Ser Val Asp Val Arg Ile Glu Val Ala Pro Lys Ile Gln Ile Asn  
 85 90 95

Ala Gln Ser Asn Ile Asn Tyr Lys Ala Ile Lys Thr Ser Val Lys Asp  
100 105 110

Ser Tyr Thr Phe Glu Asn Phe Val Val Gly Ser Cys Asn Asn Thr Val  
115 120 125

Tyr Glu Ile Ala Lys Lys Val Ala Gln Ser Asp Thr Pro Pro Tyr Asn  
130 135 140

Pro Val Leu Phe Tyr Gly Gly Thr Gly Leu Gly Lys Thr His Ile Leu  
145 150 155 160

Asn Ala Ile Gly Asn His Ala Leu Glu Lys His Lys Lys Val Val Leu  
165 170 175

Val Thr Ser Glu Asp Phe Leu Thr Asp Phe Leu Lys His Leu Asp Asn  
180 185 190

Lys Thr Met Asp Ser Phe Lys Ala Lys Tyr Arg His Cys Asp Phe Phe  
195 200 205

Leu Leu Asp Asp Ala Gln Phe Leu Gln Gly Lys Pro Lys Leu Glu Glu  
210 215 220

Glu Phe Phe His Thr Phe Asn Glu Leu His Ala Asn Ser Lys Gln Ile  
225 230 235 240

Val Leu Ile Ser Asp Arg Ser Pro Lys Asn Ile Ala Gly Leu Glu Asp  
245 250 255

Arg Leu Lys Ser Arg Phe Glu Trp Gly Ile Thr Ala Lys Val Met Pro  
260 265 270

Pro Asp Leu Glu Thr Lys Leu Ser Ile Val Lys Gln Lys Cys Gln Leu  
275 280 285

Asn Gln Ile Thr Leu Pro Glu Glu Val Met Glu Tyr Ile Ala Gln His  
290 295 300

Ile Ser Asp Asn Ile Arg Gln Met Glu Gly Ala Ile Ile Lys Ile Ser  
305 310 315 320

Val Asn Ala Asn Leu Met Asn Ala Ser Ile Asp Leu Asn Leu Ala Lys  
325 330 335

Thr Val Leu Glu Asp Leu Gln Lys Asp His Ala Glu Gly Ser Ser Leu  
340 345 350

Glu Asn Ile Leu Leu Ala Val Ala Gln Ser Leu Asn Leu Lys Ser Ser  
 355 360 365

Glu Ile Lys Val Ser Ser Arg Gln Lys Asn Val Ala Leu Ala Arg Lys  
 370 375 380

Leu Val Val Tyr Phe Ala Arg Leu Tyr Thr Pro Asn Pro Thr Leu Ser  
 385 390 395 400

Leu Ala Gln Phe Leu Asp Leu Lys Asp His Ser Ser Ile Ser Lys Met  
 405 410 415

Tyr Ser Gly Val Lys Lys Met Leu Glu Glu Glu Lys Ser Pro Phe Val  
 420 425 430

Leu Ser Leu Arg Glu Glu Ile Lys Asn Arg Leu Asn Glu Leu Asn Asp  
 435 440 445

Lys Lys Thr Ala Phe Asn Ser Ser Glu  
 450 455

<210> 104

<211> 1305

<212> DNA

<213> *Thermus thermophilus*

<400> 104

gtgtcgcacg aggccgtctg gcaacacggt ctggagcaca tccgccgcag catcaccgag 60  
 gtggagtcc acacctggtt tgaaaggatc cgccccttgg ggatccggga cggggtgctg 120  
 gagctcgccg tgcccacctc ctttgccctg gactggatcc ggcgccacta cgccggcctc 180  
 atccaggagg gccctcggtt cctcgggggc caggcgcccc ggtttgagct cggggtggtg 240  
 cccgggggtcg tagtccagga ggacatcttc cagccccgc cgagcccccc ggcccaagct 300  
 caacccgaag atacctttaa aacttcgttg tggggcccaa caactccatg gcccacggc 360  
 ggcgccgtgg ccgtggccga gtccccggc cgggcctaca acccctctt catctacggg 420  
 ggccgtggcc tgggaaagac ctacctgatg cagccgtgg gccactccg tgcgaagcgc 480  
 ttccccaca tgagattaga gtacgtttcc acggaaactt tcaccaacga gtcatcaac 540  
 cggccatccg cgagggaccg gatgacggag ttccgggagc ggtaccgctc cgtggacctc 600  
 ctgctggtgg acgacgtcca gttcatcgcc ggaaaggagc gcaccagga ggagtttttc 660  
 cacaccttca acgcccttta cgaggccac aagcagatca tcctctctc cgaccggccg 720  
 cccaaggaca tcctcaccct ggaggcgcg ctcgggagcc gctttgagtg gggcctgata 780  
 accgacaatc cagccccga cctggaaacc cggatcgcca tcctgaagat gaacgccagc 840  
 agcgggcctg aggatccga ggacgccctg gactacatcg cccggcaggt cacctccaac 900  
 atccgggagt gggaaggggc cctcatgcgg gcacgcctt tcgcctccct caacggcggt 960  
 gagctgaccc gcgccgtggc ggccaaggct ctccgacatc ttgcgccag ggagctggag 1020  
 gcggaccctc tggagatcat ccgcaaagcg gcgggaccag ttcggcctga aacccggga 1080  
 ggagctcacg gggagcgccg caagaaggag gtggtcctcc cccggcagct cgccatgtac 1140

ctggtgcggg agctcacccc ggctccctg cccgagatcg accagctcaa cgacgaccgg 1200  
gaccacacca cggtcctcta cgccatccag aaggtccagg agctcgcgga aagcgaccgg 1260  
gaggtgcagg gcctcctccg caccctccgg gaggcgtgca catga 1305

<210> 105

<211> 434

<212> PRT

<213> *Thermus thermophilus*

<400> 105

Val Ser His Glu Ala Val Trp Gln His Val Leu Glu His Ile Arg Arg  
1 5 10 15

Ser Ile Thr Glu Val Glu Phe His Thr Trp Phe Glu Arg Ile Arg Pro  
20 25 30

Leu Gly Ile Arg Asp Gly Val Leu Glu Leu Ala Val Pro Thr Ser Phe  
35 40 45

Ala Leu Asp Trp Ile Arg Arg His Tyr Ala Gly Leu Ile Gln Glu Gly  
50 55 60

Pro Arg Leu Leu Gly Ala Gln Ala Pro Arg Phe Glu Leu Arg Val Val  
65 70 75 80

Pro Gly Val Val Val Gln Glu Asp Ile Phe Gln Pro Pro Pro Ser Pro  
85 90 95

Pro Ala Gln Ala Gln Pro Glu Asp Thr Phe Lys Thr Ser Trp Trp Gly  
100 105 110

Pro Thr Thr Pro Trp Pro His Gly Gly Ala Val Ala Val Ala Glu Ser  
115 120 125

Pro Gly Arg Ala Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Arg Gly Leu  
130 135 140

Gly Lys Thr Tyr Leu Met His Ala Val Gly Pro Leu Arg Ala Lys Arg  
145 150 155 160

Phe Pro His Met Arg Leu Glu Tyr Val Ser Thr Glu Thr Phe Thr Asn  
165 170 175

Glu Leu Ile Asn Arg Pro Ser Ala Arg Asp Arg Met Thr Glu Phe Arg  
180 185 190

Glu Arg Tyr Arg Ser Val Asp Leu Leu Leu Val Asp Asp Val Gln Phe



195

200

205

Ile Ala Gly Lys Glu Arg Thr Gln Glu Glu Phe Phe His Thr Phe Asn  
 210 215 220

Ala Leu Tyr Glu Ala His Lys Gln Ile Ile Leu Ser Ser Asp Arg Pro  
 225 230 235 240

Pro Lys Asp Ile Leu Thr Leu Glu Ala Arg Leu Arg Ser Arg Phe Glu  
 245 250 255

Trp Gly Leu Ile Thr Asp Asn Pro Ala Pro Asp Leu Glu Thr Arg Ile  
 260 265 270

Ala Ile Leu Lys Met Asn Ala Ser Ser Gly Pro Glu Asp Pro Glu Asp  
 275 280 285

Ala Leu Glu Tyr Ile Ala Arg Gln Val Thr Ser Asn Ile Arg Glu Trp  
 290 295 300

Glu Gly Ala Leu Met Arg Ala Ser Pro Phe Ala Ser Leu Asn Gly Val  
 305 310 315 320

Glu Leu Thr Arg Ala Val Ala Ala Lys Ala Leu Arg His Leu Arg Pro  
 325 330 335

Arg Glu Leu Glu Ala Asp Pro Leu Glu Ile Ile Arg Lys Ala Ala Gly  
 340 345 350

Pro Val Arg Pro Glu Thr Pro Gly Gly Ala His Gly Glu Arg Arg Lys  
 355 360 365

Lys Glu Val Val Leu Pro Arg Gln Leu Ala Met Tyr Leu Val Arg Glu  
 370 375 380

Leu Thr Pro Ala Ser Leu Pro Glu Ile Asp Gln Leu Asn Asp Asp Arg  
 385 390 395 400

Asp His Thr Thr Val Leu Tyr Ala Ile Gln Lys Val Gln Glu Leu Ala  
 405 410 415

Glu Ser Asp Arg Glu Val Gln Gly Leu Leu Arg Thr Leu Arg Glu Ala  
 420 425 430

Cys Thr

<210> 106  
 <211> 1128  
 <212> DNA  
 <213> *Thermus thermophilus*

<400> 106  
 atgaacataa cgggttcccaa aaaactcctc tcggaccagc tttccctcct ggagcgcac 60  
 gtcccctcta gaagcgccaa cccctctac acctacctgg ggctttacgc cgaggaaggg 120  
 gccttgatcc tcttcgggac caacggggag gtggacctcg aggtccgcct ccccgccgag 180  
 gccc aaagcc tccccgggt gctcgtcccc gccagccct tcttcagct ggtgcggagc 240  
 ctctctgggg acctcgtggc cctcggcctc gcctcggagc cgggccaggg ggggcagctg 300  
 gagctctcct ccgggcggtt ccgcaccccg ctcagcctgg cccctgccga gggctacccc 360  
 gagcttctgg tgcccaggag ggaggacaag ggggccttcc ccctccggac gcggatgccc 420  
 tccggggagc tcgtcaaggc cttgacctac gtgcgctacg ccgcgagcaa cgaggagtag 480  
 cgggccatct tccgcggggt gcagctggag ttctcccccc agggcttccg ggcgggtggc 540  
 tccgacgggt accgcctcgc cctctacgac ctgcccctgc cccaagggtt ccaggccaag 600  
 gccgtggtcc ccgcccggag cgtggacgag atggtgcggg tcctgaaggg ggcggacggg 660  
 gccgaggccg tcctcgcctt gggcgagggg gtgttgggcc tggccctcga gggcggaagc 720  
 ggggtccgga tggccctccg cctcatggaa ggggagttcc ccgactacca gagggtcacc 780  
 ccccaggagt tcgccctcaa ggtccagggt gagggggagg ccctcaggga ggcgggtgcg 840  
 cgggtgagcg tcctctccga ccggcagaac caccgggtgg acctcctttt ggaggaaggc 900  
 cggatcctcc tctccgccga gggggactac ggcaaggggc aggaggaggt gcccgcccag 960  
 gtggaggggc cggacatggc cgtggcctac aacgcccgt acctcctcga ggcctctgcc 1020  
 cccgtggggg accgggcccc cctgggcacg tccgggcccc cgagcccag cctcatctgg 1080  
 ggggacgggg aggggtaccg ggcgggtggtg gtgcccctca ggggtctag 1128

<210> 107  
 <211> 376  
 <212> PRT  
 <213> *Thermus thermophilus*

<400> 107  
 Met Asn Ile Thr Val Pro Lys Lys Leu Leu Ser Asp Gln Leu Ser Leu  
 1 5 10 15  
 Leu Glu Arg Ile Val Pro Ser Arg Ser Ala Asn Pro Leu Tyr Thr Tyr  
 20 25 30  
 Leu Gly Leu Tyr Ala Glu Glu Gly Ala Leu Ile Leu Phe Gly Thr Asn  
 35 40 45  
 Gly Glu Val Asp Leu Glu Val Arg Leu Pro Ala Glu Ala Gln Ser Leu  
 50 55 60  
 Pro Arg Val Leu Val Pro Ala Gln Pro Phe Phe Gln Leu Val Arg Ser  
 65 70 75 80

Leu Pro Gly Asp Leu Val Ala Leu Gly Leu Ala Ser Glu Pro Gly Gln  
                     85                    90                    95  
 Gly Gly Gln Leu Glu Leu Ser Ser Gly Arg Phe Arg Thr Arg Leu Ser  
                     100                    105                    110  
 Leu Ala Pro Ala Glu Gly Tyr Pro Glu Leu Leu Val Pro Glu Gly Glu  
                     115                    120                    125  
 Asp Lys Gly Ala Phe Pro Leu Arg Thr Arg Met Pro Ser Gly Glu Leu  
                     130                    135                    140  
 Val Lys Ala Leu Thr His Val Arg Tyr Ala Ala Ser Asn Glu Glu Tyr  
 145                    150                    155                    160  
 Arg Ala Ile Phe Arg Gly Val Gln Leu Glu Phe Ser Pro Gln Gly Phe  
                     165                    170                    175  
 Arg Ala Val Ala Ser Asp Gly Tyr Arg Leu Ala Leu Tyr Asp Leu Pro  
                     180                    185                    190  
 Leu Pro Gln Gly Phe Gln Ala Lys Ala Val Val Pro Ala Arg Ser Val  
                     195                    200                    205  
 Asp Glu Met Val Arg Val Leu Lys Gly Ala Asp Gly Ala Glu Ala Val  
                     210                    215                    220  
 Leu Ala Leu Gly Glu Gly Val Leu Ala Leu Ala Leu Glu Gly Gly Ser  
 225                    230                    235                    240  
 Gly Val Arg Met Ala Leu Arg Leu Met Glu Gly Glu Phe Pro Asp Tyr  
                     245                    250                    255  
 Gln Arg Val Ile Pro Gln Glu Phe Ala Leu Lys Val Gln Val Glu Gly  
                     260                    265                    270  
 Glu Ala Leu Arg Glu Ala Val Arg Arg Val Ser Val Leu Ser Asp Arg  
                     275                    280                    285  
 Gln Asn His Arg Val Asp Leu Leu Leu Glu Glu Gly Arg Ile Leu Leu  
                     290                    295                    300  
 Ser Ala Glu Gly Asp Tyr Gly Lys Gly Gln Glu Glu Val Pro Ala Gln  
 305                    310                    315                    320  
 Val Glu Gly Pro Asp Met Ala Val Ala Tyr Asn Ala Arg Tyr Leu Leu  
                     325                    330                    335

Glu Ala Leu Ala Pro Val Gly Asp Arg Ala His Leu Gly Ile Ser Gly  
 340 345 350

Pro Thr Ser Pro Ser Leu Ile Trp Gly Asp Gly Glu Gly Tyr Arg Ala  
 355 360 365

Val Val Val Pro Leu Arg Val Glx  
 370 375

<210> 108

<211> 376

<212> PRT

<213> *Thermus thermophilus*

<400> 108

Met Asn Ile Thr Val Pro Lys Lys Leu Leu Ser Asp Gln Leu Ser Leu  
 1 5 10 15

Leu Glu Arg Ile Val Pro Ser Arg Ser Ala Asn Pro Leu Tyr Thr Tyr  
 20 25 30

Leu Gly Leu Tyr Ala Glu Glu Gly Ala Leu Ile Leu Phe Gly Thr Asn  
 35 40 45

Gly Glu Val Asp Leu Glu Val Arg Leu Pro Ala Glu Ala Gln Ser Leu  
 50 55 60

Pro Arg Val Leu Val Pro Ala Gln Pro Phe Phe Gln Leu Val Arg Ser  
 65 70 75 80

Leu Pro Gly Asp Leu Val Ala Leu Gly Leu Ala Ser Glu Pro Gly Gln  
 85 90 95

Gly Gly Gln Leu Glu Leu Ser Ser Gly Arg Phe Arg Thr Arg Leu Ser  
 100 105 110

Leu Ala Pro Ala Glu Gly Tyr Pro Glu Leu Leu Val Pro Glu Gly Glu  
 115 120 125

Asp Lys Gly Ala Phe Pro Leu Arg Thr Arg Met Pro Ser Gly Glu Leu  
 130 135 140

Val Lys Ala Leu Thr His Val Arg Tyr Ala Ala Ser Asn Glu Glu Tyr  
 145 150 155 160

Arg Ala Ile Phe Arg Gly Val Gln Leu Glu Phe Ser Pro Gln Gly Phe  
 165 170 175

Arg Ala Val Ala Ser Asp Gly Tyr Arg Leu Ala Leu Tyr Asp Leu Pro  
 180 185 190  
 Leu Pro Gln Gly Phe Gln Ala Lys Ala Val Val Pro Ala Arg Ser Val  
 195 200 205  
 Asp Glu Met Val Arg Val Leu Lys Gly Ala Asp Gly Ala Glu Ala Val  
 210 215 220  
 Leu Ala Leu Gly Glu Gly Val Leu Ala Leu Ala Leu Glu Gly Gly Ser  
 225 230 235 240  
 Gly Val Arg Met Ala Leu Arg Leu Met Glu Gly Glu Phe Pro Asp Tyr  
 245 250 255  
 Gln Arg Val Ile Pro Gln Glu Phe Ala Leu Lys Val Gln Val Glu Gly  
 260 265 270  
 Glu Ala Leu Arg Glu Ala Val Arg Arg Val Ser Val Leu Ser Asp Arg  
 275 280 285  
 Gln Asn His Arg Val Asp Leu Leu Leu Glu Glu Gly Arg Ile Leu Leu  
 290 295 300  
 Ser Ala Glu Gly Asp Tyr Gly Lys Gly Gln Glu Glu Val Pro Ala Gln  
 305 310 315 320  
 Val Glu Gly Pro Asp Met Ala Val Ala Tyr Asn Ala Arg Tyr Leu Leu  
 325 330 335  
 Glu Ala Leu Ala Pro Val Gly Asp Arg Ala His Leu Gly Ile Ser Gly  
 340 345 350  
 Pro Thr Ser Pro Ser Leu Ile Trp Gly Asp Gly Glu Gly Tyr Arg Ala  
 355 360 365  
 Val Val Val Pro Leu Arg Val Glx  
 370 375

<210> 109

<211> 367

<212> PRT

<213> Escherichia coli

<400> 109

Met Lys Phe Thr Val Glu Arg Glu His Leu Leu Lys Pro Leu Gln Gln

1	5	10	15
Val Ser Gly Pro Leu Gly Gly Arg Pro Thr Leu Pro Ile Leu Gly Asn	20	25	30
Leu Leu Leu Gln Val Ala Asp Gly Thr Leu Ser Leu Thr Gly Thr Asp	35	40	45
Leu Glu Met Glu Met Val Ala Arg Val Ala Leu Val Gln Pro His Glu	50	55	60
Pro Gly Ala Thr Thr Val Pro Ala Arg Lys Phe Phe Asp Ile Cys Arg	65	70	75
Gly Leu Pro Glu Gly Ala Glu Ile Ala Val Gln Leu Glu Gly Glu Arg	85	90	95
Met Leu Val Arg Ser Gly Arg Ser Arg Phe Ser Leu Ser Thr Leu Pro	100	105	110
Ala Ala Asp Phe Pro Asn Leu Asp Asp Trp Gln Ser Glu Val Glu Phe	115	120	125
Thr Leu Pro Gln Ala Thr Met Lys Arg Leu Ile Glu Ala Thr Gln Phe	130	135	140
Ser Met Ala His Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Phe	145	150	155
Glu Thr Glu Gly Glu Glu Leu Arg Thr Val Ala Thr Asp Gly His Arg	165	170	175
Leu Ala Val Cys Ser Met Pro Ile Gly Gln Ser Leu Pro Ser His Ser	180	185	190
Val Ile Val Pro Arg Lys Gly Val Ile Glu Leu Met Arg Met Leu Asp	195	200	205
Gly Gly Asp Asn Pro Leu Arg Val Gln Ile Gly Ser Asn Asn Ile Arg	210	215	220
Ala His Val Gly Asp Phe Ile Phe Thr Ser Lys Leu Val Asp Gly Arg	225	230	235
Phe Pro Asp Tyr Arg Arg Val Leu Pro Lys Asn Pro Asp Lys His Leu	245	250	255
Glu Ala Gly Cys Asp Leu Leu Lys Gln Ala Phe Ala Arg Ala Ala Ile			

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260	265	270
Leu Ser Asn Glu Lys Phe Arg Gly Val Arg Leu Tyr Val Ser Glu Asn		
275	280	285
Gln Leu Lys Ile Thr Ala Asn Asn Pro Glu Gln Glu Ala Glu Glu		
290	295	300
Ile Leu Asp Val Thr Tyr Ser Gly Ala Glu Met Glu Ile Gly Phe Asn		
305	310	315
Val Ser Tyr Val Leu Asp Val Leu Asn Ala Leu Lys Cys Glu Asn Val		
325	330	335
Arg Met Met Leu Thr Asp Ser Val Ser Ser Val Gln Ile Glu Asp Ala		
340	345	350
Ala Ser Gln Ser Ala Ala Tyr Val Val Met Pro Met Arg Leu Glx		
355	360	365
<210> 110		
<211> 367		
<212> PRT		
<213> Proteus mirabilis		
<400> 110		
Met Lys Phe Ile Ile Glu Arg Glu Gln Leu Leu Lys Pro Leu Gln Gln		
1	5	10
Val Ser Gly Pro Leu Gly Gly Arg Pro Thr Leu Pro Ile Leu Gly Asn		
20	25	30
Leu Leu Leu Lys Val Thr Glu Asn Thr Leu Ser Leu Thr Gly Thr Asp		
35	40	45
Leu Glu Met Glu Met Met Ala Arg Val Ser Leu Ser Gln Ser His Glu		
50	55	60
Ile Gly Ala Thr Thr Val Pro Ala Arg Lys Phe Phe Asp Ile Trp Arg		
65	70	75
Gly Leu Pro Glu Gly Ala Glu Ile Ser Val Glu Leu Asp Gly Asp Arg		
85	90	95
Leu Leu Val Arg Ser Gly Arg Ser Arg Phe Ser Leu Ser Thr Leu Pro		
100	105	110

Ala	Ser	Asp	Phe	Pro	Asn	Leu	Asp	Asp	Trp	Gln	Ser	Glu	Val	Glu	Phe	115	120	125	
Thr	Leu	Pro	Gln	Ala	Thr	Leu	Lys	Arg	Leu	Ile	Glu	Ser	Thr	Gln	Phe	130	135	140	
Ser	Met	Ala	His	Gln	Asp	Val	Arg	Tyr	Tyr	Leu	Asn	Gly	Met	Leu	Phe	145	150	155	160
Glu	Thr	Glu	Asn	Thr	Glu	Leu	Arg	Thr	Val	Ala	Thr	Asp	Gly	His	Arg	165	170	175	
Leu	Ala	Val	Cys	Ala	Met	Asp	Ile	Gly	Gln	Ser	Leu	Pro	Gly	His	Ser	180	185	190	
Val	Ile	Val	Pro	Arg	Lys	Gly	Val	Ile	Glu	Leu	Met	Arg	Leu	Leu	Asp	195	200	205	
Gly	Ser	Gly	Glu	Ser	Leu	Leu	Gln	Leu	Gln	Ile	Gly	Ser	Asn	Asn	Leu	210	215	220	
Arg	Ala	His	Val	Gly	Asp	Phe	Ile	Phe	Thr	Ser	Lys	Leu	Val	Asp	Gly	225	230	235	240
Arg	Phe	Pro	Asp	Tyr	Arg	Arg	Val	Leu	Pro	Lys	Asn	Pro	Thr	Lys	Thr	245	250	255	
Val	Ile	Ala	Gly	Cys	Asp	Ile	Leu	Lys	Gln	Ala	Phe	Ser	Arg	Ala	Ala	260	265	270	
Ile	Leu	Ser	Asn	Glu	Lys	Phe	Arg	Gly	Val	Arg	Ile	Asn	Leu	Thr	Asn	275	280	285	
Gly	Gln	Leu	Lys	Ile	Thr	Ala	Asn	Asn	Pro	Glu	Gln	Glu	Glu	Ala	Glu	290	295	300	
Glu	Ile	Val	Asp	Val	Gln	Tyr	Gln	Gly	Glu	Glu	Met	Glu	Ile	Gly	Phe	305	310	315	320
Asn	Val	Ser	Tyr	Leu	Leu	Asp	Val	Leu	Asn	Thr	Leu	Lys	Cys	Glu	Glu	325	330	335	
Val	Lys	Leu	Leu	Leu	Thr	Asp	Ala	Val	Ser	Ser	Val	Gln	Val	Glu	Asn	340	345	350	
Val	Ala	Ser	Ala	Ala	Ala	Ala	Tyr	Val	Val	Met	Pro	Met	Arg	Leu		355	360	365	



<210> 111  
 <211> 366  
 <212> PRT  
 <213> Haemophilus influenzae

<400> 111

Met Gln Phe Ser Ile Ser Arg Glu Asn Leu Leu Lys Pro Leu Gln Gln  
 1 5 10 15

Val Cys Gly Val Leu Ser Asn Arg Pro Asn Ile Pro Val Leu Asn Asn  
 20 25 30

Val Leu Leu Gln Ile Glu Asp Tyr Arg Leu Thr Ile Thr Gly Thr Asp  
 35 40 45

Leu Glu Val Glu Leu Ser Ser Gln Thr Gln Leu Ser Ser Ser Ser Glu  
 50 55 60

Asn Gly Thr Phe Thr Ile Pro Ala Lys Lys Phe Leu Asp Ile Cys Arg  
 65 70 75 80

Thr Leu Ser Asp Asp Ser Glu Ile Thr Val Thr Phe Glu Gln Asp Arg  
 85 90 95

Ala Leu Val Gln Ser Gly Arg Ser Arg Phe Thr Leu Ala Thr Gln Pro  
 100 105 110

Ala Glu Glu Tyr Pro Asn Leu Thr Asp Trp Gln Ser Glu Val Asp Phe  
 115 120 125

Glu Leu Pro Gln Asn Thr Leu Arg Arg Leu Ile Glu Ala Thr Gln Phe  
 130 135 140

Ser Met Ala Asn Gln Asp Ala Arg Tyr Phe Leu Asn Gly Met Lys Phe  
 145 150 155 160

Glu Thr Glu Gly Asn Leu Leu Arg Thr Val Ala Thr Asp Gly His Arg  
 165 170 175

Leu Ala Val Cys Thr Ile Ser Leu Glu Gln Glu Leu Gln Asn His Ser  
 180 185 190

Val Ile Leu Pro Arg Lys Gly Val Leu Glu Leu Val Arg Leu Leu Glu  
 195 200 205

Thr Asn Asp Glu Pro Ala Arg Leu Gln Ile Gly Thr Asn Asn Leu Arg  
 210 215 220

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Val His Leu Lys Asn Thr Val Phe Thr Ser Lys Leu Ile Asp Gly Arg  
 225 230 235 240  
 Phe Pro Asp Tyr Arg Arg Val Leu Pro Arg Asn Ala Thr Lys Ile Val  
 245 250 255  
 Glu Gly Asn Trp Glu Met Leu Lys Gln Ala Phe Ala Arg Ala Ser Ile  
 260 265 270  
 Leu Ser Asn Glu Arg Ala Arg Ser Val Arg Leu Ser Leu Lys Glu Asn  
 275 280 285  
 Gln Leu Lys Ile Thr Ala Ser Asn Thr Glu His Glu Glu Ala Glu Glu  
 290 295 300  
 Ile Val Asp Val Asn Tyr Asn Gly Glu Glu Leu Glu Val Gly Phe Asn  
 305 310 315 320  
 Val Thr Tyr Ile Leu Asp Val Leu Asn Ala Leu Lys Cys Asn Gln Val  
 325 330 335  
 Arg Met Cys Leu Thr Asp Ala Phe Ser Ser Cys Leu Ile Glu Asn Cys  
 340 345 350  
 Glu Asp Ser Ser Cys Glu Tyr Val Ile Met Pro Met Arg Leu  
 355 360 365

<210> 112  
 <211> 367  
 <212> PRT  
 <213> Pseudomonas putida

<400> 112  
 Met His Phe Thr Ile Gln Arg Glu Ala Leu Leu Lys Pro Leu Gln Leu  
 1 5 10 15  
 Val Ala Gly Val Val Glu Arg Arg Gln Thr Leu Pro Val Leu Ser Asn  
 20 25 30  
 Val Leu Leu Val Val Gln Gly Gln Gln Leu Ser Leu Thr Gly Thr Asp  
 35 40 45  
 Leu Glu Val Glu Leu Val Gly Arg Val Gln Leu Glu Glu Pro Ala Glu  
 50 55 60  
 Pro Gly Glu Ile Thr Val Pro Ala Arg Lys Leu Met Asp Ile Cys Lys

65		70		75		80
Ser Leu Pro Asn Asp Ala Leu Ile Asp Ile Lys Val Asp Glu Gln Lys						
	85			90		95
Leu Leu Val Lys Ala Gly Arg Ser Arg Phe Thr Leu Ser Thr Leu Pro						
	100			105		110
Ala Asn Asp Phe Pro Thr Val Glu Glu Gly Pro Gly Ser Leu Thr Cys						
	115			120		125
Asn Leu Glu Gln Ser Lys Leu Arg Arg Leu Ile Glu Arg Thr Ser Phe						
	130			135		140
Ala Met Ala Gln Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Leu						
145		150		155		160
Glu Val Ser Arg Asn Thr Leu Arg Ala Val Ser Thr Asp Gly His Arg						
	165			170		175
Leu Ala Leu Cys Ser Met Ser Ala Pro Ile Glu Gln Glu Asp Arg His						
	180			185		190
Gln Val Ile Val Pro Arg Lys Gly Ile Leu Glu Leu Ala Arg Leu Leu						
	195			200		205
Thr Asp Pro Glu Gly Met Val Ser Ile Val Leu Gly Gln His His Ile						
	210			215		220
Arg Ala Thr Thr Gly Glu Phe Thr Phe Thr Ser Lys Leu Val Asp Gly						
225		230		235		240
Lys Phe Pro Asp Tyr Glu Arg Val Leu Pro Lys Gly Gly Asp Lys Leu						
	245			250		255
Val Val Gly Asp Arg Gln Ala Leu Arg Glu Ala Phe Ser Arg Thr Ala						
	260			265		270
Ile Leu Ser Asn Glu Lys Tyr Arg Gly Ile Arg Leu Gln Leu Ala Ala						
	275			280		285
Gly Gln Leu Lys Ile Gln Ala Asn Asn Pro Glu Gln Glu Glu Ala Glu						
	290			295		300
Glu Glu Ile Ser Val Asp Tyr Glu Gly Ser Ser Leu Glu Ile Gly Phe						
305		310		315		320
Asn Val Ser Tyr Leu Leu Asp Val Leu Gly Val Met Thr Thr Glu Gln						

325

330

335

Val Arg Leu Ile Leu Ser Asp Ser Asn Ser Ser Ala Leu Leu Gln Glu  
 340 345 350

Ala Gly Asn Asp Asp Ser Ser Tyr Val Val Met Pro Met Arg Leu  
 355 360 365

&lt;210&gt; 113

&lt;211&gt; 366

&lt;212&gt; PRT

&lt;213&gt; Buchnera aphidicola

&lt;400&gt; 113

Met Lys Phe Thr Ile Gln Asn Asp Ile Leu Thr Lys Asn Leu Lys Lys  
 1 5 10 15

Ile Thr Arg Val Leu Val Lys Asn Ile Ser Phe Pro Ile Leu Glu Asn  
 20 25 30

Ile Leu Ile Gln Val Glu Asp Gly Thr Leu Ser Leu Thr Thr Thr Asn  
 35 40 45

Leu Glu Ile Glu Leu Ile Ser Lys Ile Glu Ile Ile Thr Lys Tyr Ile  
 50 55 60

Pro Gly Lys Thr Thr Ile Ser Gly Arg Lys Ile Leu Asn Ile Cys Arg  
 65 70 75 80

Thr Leu Ser Glu Lys Ser Lys Ile Lys Met Gln Leu Lys Asn Lys Lys  
 85 90 95

Met Tyr Ile Ser Ser Glu Asn Ser Asn Tyr Ile Leu Ser Thr Leu Ser  
 100 105 110

Ala Asp Thr Phe Pro Asn His Gln Asn Phe Asp Tyr Ile Ser Lys Phe  
 115 120 125

Asp Ile Ser Ser Asn Ile Leu Lys Glu Met Ile Glu Lys Thr Glu Phe  
 130 135 140

Ser Met Gly Lys Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Leu  
 145 150 155 160

Glu Lys Lys Asp Lys Phe Leu Arg Ser Val Ala Thr Asp Gly Tyr Arg  
 165 170 175

Leu Ala Ile Ser Tyr Thr Gln Leu Lys Lys Asp Ile Asn Phe Phe Ser  
 180 185 190  
 Ile Ile Ile Pro Asn Lys Ala Val Met Glu Leu Leu Lys Leu Leu Asn  
 195 200 205  
 Thr Gln Pro Gln Leu Leu Asn Ile Leu Ile Gly Ser Asn Ser Ile Arg  
 210 215 220  
 Ile Tyr Thr Lys Asn Leu Ile Phe Thr Thr Gln Leu Ile Glu Gly Glu  
 225 230 235 240  
 Tyr Pro Asp Tyr Lys Ser Val Leu Phe Lys Glu Lys Lys Asn Pro Ile  
 245 250 255  
 Ile Thr Asn Ser Ile Leu Leu Lys Lys Ser Leu Leu Arg Val Ala Ile  
 260 265 270  
 Leu Ala His Glu Lys Phe Cys Gly Ile Glu Ile Lys Ile Glu Asn Gly  
 275 280 285  
 Lys Phe Lys Val Leu Ser Asp Asn Gln Glu Glu Glu Thr Ala Glu Asp  
 290 295 300  
 Leu Phe Glu Ile Asp Tyr Phe Gly Glu Lys Ile Glu Ile Ser Ile Asn  
 305 310 315 320  
 Val Tyr Tyr Leu Leu Asp Val Ile Asn Asn Ile Lys Ser Glu Asn Ile  
 325 330 335  
 Ala Leu Phe Leu Asn Lys Ser Lys Ser Ser Ile Gln Ile Glu Ala Glu  
 340 345 350  
 Asn Asn Ser Ser Asn Ala Tyr Val Val Met Leu Leu Lys Arg  
 355 360 365

<210> 114

<211> 39

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<211> 1161

<212> PRT

<213> Aquifex aeolicus

<400> 118

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Thr	Lys	Thr	Ser	Glu	Asp	Asn	Ile	Thr	Asp	Lys	Tyr	Asn	His	His	Leu
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Ile	Leu	Ile	Ala	Lys	Asp	Asp	Lys	Gly	Leu	Lys	Asn	Leu	Met	Lys	Leu
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Cys	Leu	Lys	Gly	Val	Pro	Thr	Tyr	Tyr	Ala	Ser	Ile	Asn	Glu	Val	Lys
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Lys	Ala	Glu	Glu	Trp	Val	Lys	Lys	Phe	Lys	Asp	Ile	Phe	Gly	Asp	Asp
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505

510

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Ser Glu Leu Val Pro Leu Tyr Tyr Asp Lys Glu Gly Glu Val Ala Thr  
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Gln Tyr Asp Met Val Gln Leu Glu Glu Leu Gly Leu Leu Lys Met Asp  
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Phe Leu Gly Leu Lys Thr Leu Thr Glu Leu Lys Leu Met Lys Glu Leu  
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Pro Gly Pro Leu Lys Ser Gly Leu Val Asp Thr Tyr Ile Lys Arg Lys  
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His Gly Lys Glu Pro Val Glu Tyr Pro Phe Pro Glu Leu Glu Pro Val  
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Met Ser Gln Ile Leu Ser Gly Phe Thr Pro Gly Glu Ala Asp Thr Leu  
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Arg Lys Ala Ile Gly Lys Lys Lys Ala Asp Leu Met Ala Gln Met Lys  
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755

760

765

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1010

1015

1020

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&lt;213&gt; Aquifex aeolicus

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<213> Aquifex aeolicus

<400> 120

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 100 105 110  
 Tyr Lys Pro Ile Lys Gly Lys Tyr Lys Val Tyr Ile Ile Asp Glu Ala  
 115 120 125  
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 180 185 190  
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 Ala Ser Glu Gly Cys Met Arg Asp Ala Ala Ser Leu Leu Asp Gln Ala  
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Leu Ile Val Lys Asp Ile Ile Pro Val Ser Gln Leu Gly Ser Val Val  
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Lys Val Lys Glu Glu Lys Pro Lys Glu Gln Glu Glu Asp Arg Phe Gln  
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Gly Ala Lys Arg Glu Glu Arg Asp Gly Lys Ile Val Leu Lys Ile Glu  
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Ala Ser Tyr Leu Arg Thr Met Lys Lys Glu Phe Asp Ser Leu Lys Glu  
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 ttccggcggaag gtcttggttg agacagagga agtcttaaag gttttaaaga ggttgaaggc 720  
 ttttaagcgaa ggaaaagttt ttcccgtgaa gattacctta agcgaaaacc ttgccatctt 780  
 tgagttcgcg gatccggagt tcggagaagc gagagaggaa attgaagtgg agtacacggg 840  
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 agcgaaagag tgtggttcaa gttcacaacc cccgacacgg ccactttatt ggaggctgaa 960  
 gattacgaaa aggaacctta caagtgcata ataatgccga tgagggtgta gccatgaaaa 1020  
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 ccaagtcttc 1090

<210> 122

<211> 363

<212> PRT

<213> Aquifex aeolicus

<400> 122

Met Arg Val Lys Val Asp Arg Glu Glu Leu Glu Glu Val Leu Lys Lys  
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Ala Arg Glu Ser Thr Glu Lys Lys Ala Ala Leu Pro Ile Leu Ala Asn  
 20 25 30

Phe Leu Leu Ser Ala Lys Glu Glu Asn Leu Ile Val Arg Ala Thr Asp  
 35 40 45

Leu Glu Asn Tyr Leu Val Val Ser Val Lys Gly Glu Val Glu Glu Glu  
 50 55 60

Gly Glu Val Cys Val His Ser Gln Lys Leu Tyr Asp Ile Val Lys Asn  
 65 70 75 80

Leu Asn Ser Ala Tyr Val Tyr Leu His Thr Glu Gly Glu Lys Leu Val  
 85 90 95

Ile Thr Gly Gly Lys Ser Thr Tyr Lys Leu Pro Thr Ala Pro Ala Glu  
 100 105 110

Asp Phe Pro Glu Phe Pro Glu Ile Val Glu Gly Gly Glu Thr Leu Ser  
 115 120 125

Gly Asn Leu Leu Val Asn Gly Ile Glu Lys Val Glu Tyr Ala Ile Ala  
 130 135 140

Lys Glu Glu Ala Asn Ile Ala Leu Gln Gly Met Tyr Leu Arg Gly Tyr  
 145 150 155 160

Glu Asp Arg Ile His Phe Val Gly Ser Asp Gly His Arg Leu Ala Leu



165

170

175

Tyr Glu Pro Leu Gly Glu Phe Ser Lys Glu Leu Leu Ile Pro Arg Lys  
 180 185 190

Ser Leu Lys Val Leu Lys Lys Leu Ile Thr Gly Ile Glu Asp Val Asn  
 195 200 205

Ile Glu Lys Ser Glu Asp Glu Ser Phe Ala Tyr Phe Ser Thr Pro Glu  
 210 215 220

Trp Lys Leu Ala Val Arg Leu Leu Glu Gly Glu Phe Pro Asp Tyr Met  
 225 230 235 240

Ser Val Ile Pro Glu Glu Phe Ser Ala Glu Val Leu Phe Glu Thr Glu  
 245 250 255

Glu Val Leu Lys Val Leu Lys Arg Leu Lys Ala Leu Ser Glu Gly Lys  
 260 265 270

Val Phe Pro Val Lys Ile Thr Leu Ser Glu Asn Leu Ala Ile Phe Glu  
 275 280 285

Phe Ala Asp Pro Glu Phe Gly Glu Ala Arg Glu Glu Ile Glu Val Glu  
 290 295 300

Tyr Thr Gly Glu Pro Phe Glu Ile Gly Phe Asn Gly Lys Tyr Leu Met  
 305 310 315 320

Glu Ala Leu Asp Ala Tyr Asp Ser Glu Arg Val Trp Phe Lys Phe Thr  
 325 330 335

Thr Pro Asp Thr Ala Thr Leu Leu Glu Ala Glu Asp Tyr Glu Lys Glu  
 340 345 350

Pro Tyr Lys Cys Ile Ile Met Pro Met Arg Val  
 355 360

<210> 123

<211> 1093

<212> DNA

<213> Aquifex aeolicus

<400> 123

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 gaaaagtacg gggagaatta caccgttctg tgggggggatg agataagcga ggaggaattc 180

tacactgccc tttccgagac cagtatatc ggcggttcaa aggaaaaagc ggtgggtcatt 240  
tacaacttcg gggatttcct gaagaagctc ggaaggaaga aaaaggaaaa agaaaggctt 300  
ataaaagtcc tcagaaacgt aaagagtaac tacgtattta tagtgtacga tgcgaaactc 360  
cagaaacagg aactttcttc ggaacctctg aaatccgtag cgtctttcgg cggtatagtg 420  
gtagcaaaca ggctgagcaa ggagaggata aaacagctcg tccttaagaa gttcaaagaa 480  
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ttgatggagc tcaaacttga ggttgaaaaa ctgatagatt acgcaagtga aaagaaaatt 600  
ttaacactcg atgaggtaaa gagagtagcc ttctcagtct cagaaaacgt aaacgtattt 660  
gagttcgttg atttactcct cttaaaagat tacgaaaagg ctcttaaagt tttggactcc 720  
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aaactttaca ccctcaagag gcttgaagag aaggagagg acctgaataa ggcatggaa 840  
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ctttactttc aggacacagt gcagttgctg gggatttctt gacctcaaga ctggagaggg 1020  
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ttttcccggt tct 1093

<210> 124  
<211> 350  
<212> PRT  
<213> Aquifex aeolicus

<400> 124  
Val Glu Thr Thr Ile Phe Gln Phe Gln Lys Thr Phe Phe Thr Lys Pro  
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Pro Lys Glu Arg Val Phe Val Leu His Gly Glu Glu Gln Tyr Leu Ile  
20 25 30  
Arg Thr Phe Leu Ser Lys Leu Lys Glu Lys Tyr Gly Glu Asn Tyr Thr  
35 40 45  
Val Leu Trp Gly Asp Glu Ile Ser Glu Glu Glu Phe Tyr Thr Ala Leu  
50 55 60  
Ser Glu Thr Ser Ile Phe Gly Gly Ser Lys Glu Lys Ala Val Val Ile  
65 70 75 80  
Tyr Asn Phe Gly Asp Phe Leu Lys Lys Leu Gly Arg Lys Lys Lys Glu  
85 90 95  
Lys Glu Arg Leu Ile Lys Val Leu Arg Asn Val Lys Ser Asn Tyr Val  
100 105 110  
Phe Ile Val Tyr Asp Ala Lys Leu Gln Lys Gln Glu Leu Ser Ser Glu  
115 120 125

Pro Leu Lys Ser Val Ala Ser Phe Gly Gly Ile Val Val Ala Asn Arg  
 130 135 140  
 Leu Ser Lys Glu Arg Ile Lys Gln Leu Val Leu Lys Lys Phe Lys Glu  
 145 150 155 160  
 Lys Gly Ile Asn Val Glu Asn Asp Ala Leu Glu Tyr Leu Leu Gln Leu  
 165 170 175  
 Thr Gly Tyr Asn Leu Met Glu Leu Lys Leu Glu Val Glu Lys Leu Ile  
 180 185 190  
 Asp Tyr Ala Ser Glu Lys Lys Ile Leu Thr Leu Asp Glu Val Lys Arg  
 195 200 205  
 Val Ala Phe Ser Val Ser Glu Asn Val Asn Val Phe Glu Phe Val Asp  
 210 215 220  
 Leu Leu Leu Leu Lys Asp Tyr Glu Lys Ala Leu Lys Val Leu Asp Ser  
 225 230 235 240  
 Leu Ile Ser Phe Gly Ile His Pro Leu Gln Ile Met Lys Ile Leu Ser  
 245 250 255  
 Ser Tyr Ala Leu Lys Leu Tyr Thr Leu Lys Arg Leu Glu Glu Lys Gly  
 260 265 270  
 Glu Asp Leu Asn Lys Ala Met Glu Ser Val Gly Ile Lys Asn Asn Phe  
 275 280 285  
 Leu Lys Met Lys Phe Lys Ser Tyr Leu Lys Ala Asn Ser Lys Glu Asp  
 290 295 300  
 Leu Lys Asn Leu Ile Leu Ser Leu Gln Arg Ile Asp Ala Phe Ser Lys  
 305 310 315 320  
 Leu Tyr Phe Gln Asp Thr Val Gln Leu Leu Arg Asp Phe Leu Thr Ser  
 325 330 335  
 Arg Leu Glu Arg Glu Val Val Lys Asn Thr Ser His Gly Gly  
 340 345 350

<210> 125

<211> 1051

<212> DNA

<213> Aquifex aeolicus

<400> 125  
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ttatgtaagg aaaacgtacc tggggatgcg gaagttgtcc ctcctgcaaa cagctaaacg 180  
agctggagga agccttcttt aaaggagaaa tagaagactt taaagtttat aagacaagga 240  
cggtaaaaag cacttcgttt accttatggg cgaacatccc gactttgttg taataatccc 300  
gagcggacat tacataaaga tagaacagat aagggaagtt aagaactttg cctatgtgaa 360  
gcccgcacta agcaggagaa aagtaattat aatagacgac gccacgcga tgacctctca 420  
ggcggcaaac gctcttttaa aggtatttga agagccacct gcggacacca cctttatctt 480  
gaccacgaac aggcgttctg caatcctgcc gactatcctc tccagaactt ttcaagtgga 540  
gttcaagggc ttttcagtaa aagaggttat ggaaatagcg aaagtagacg aggaaatagc 600  
gaaactctct ggaggcagtc taaaaagggc tatcttacta aaggaaaaca aagatatcct 660  
aaacaaaagta aaggaattct tggaaaacga gccgttaaaa gtttacaagc ttgcaagtga 720  
attcgaaaag tgggaacctg aaaagcaaaa actcttcctt gaaattatgg aagaattggt 780  
atctcaaaaa ttgaccgaag agaaaaaaga caattacacc taccttcttg atacgatcag 840  
actctttaa gacggactcg caaggggtgt aaacgaacct ctgtggctgt ttacgttagc 900  
cgttcaggcg gattaataaa ccgttattga ttccgtaaca tttaaaccctt aatctaaatt 960  
atgagagcct ttgaaggagg tctggtatgg aaaatttgaa gattagatat atagatacga 1020  
ggaagatagg aaccgtgagc ggtgtaaaag t 1051

<210> 126  
<211> 305  
<212> PRT  
<213> Aquifex aeolicus

<400> 126  
Met Glu Lys Val Phe Leu Glu Lys Leu Gln Lys Thr Leu His Ile Pro  
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Gly Gly Leu Leu Phe Tyr Gly Lys Glu Gly Ser Gly Lys Thr Lys Thr  
20 25 30  
Ala Phe Glu Phe Ala Lys Gly Ile Leu Cys Lys Glu Asn Val Pro Trp  
35 40 45  
Gly Cys Gly Ser Cys Pro Ser Cys Lys His Val Asn Glu Leu Glu Glu  
50 55 60  
Ala Phe Phe Lys Gly Glu Ile Glu Asp Phe Lys Val Tyr Lys Asp Lys  
65 70 75 80  
Asp Gly Lys Lys His Phe Val Tyr Leu Met Gly Glu His Pro Asp Phe  
85 90 95  
Val Val Ile Ile Pro Ser Gly His Tyr Ile Lys Ile Glu Gln Ile Arg  
100 105 110

Glu Val Lys Asn Phe Ala Tyr Val Lys Pro Ala Leu Ser Arg Arg Lys  
 115 120 125  
 Val Ile Ile Ile Asp Asp Ala His Ala Met Thr Ser Gln Ala Ala Asn  
 130 135 140  
 Ala Leu Leu Lys Val Leu Glu Glu Pro Pro Ala Asp Thr Thr Phe Ile  
 145 150 155 160  
 Leu Thr Thr Asn Arg Arg Ser Ala Ile Leu Pro Thr Ile Leu Ser Arg  
 165 170 175  
 Thr Phe Gln Val Glu Phe Lys Gly Phe Ser Val Lys Glu Val Met Glu  
 180 185 190  
 Ile Ala Lys Val Asp Glu Glu Ile Ala Lys Leu Ser Gly Gly Ser Leu  
 195 200 205  
 Lys Arg Ala Ile Leu Leu Lys Glu Asn Lys Asp Ile Leu Asn Lys Val  
 210 215 220  
 Lys Glu Phe Leu Glu Asn Glu Pro Leu Lys Val Tyr Lys Leu Ala Ser  
 225 230 235 240  
 Glu Phe Glu Lys Trp Glu Pro Glu Lys Gln Lys Leu Phe Leu Glu Ile  
 245 250 255  
 Met Glu Glu Leu Val Ser Gln Lys Leu Thr Glu Glu Lys Lys Asp Asn  
 260 265 270  
 Tyr Thr Tyr Leu Leu Asp Thr Ile Arg Leu Phe Lys Asp Gly Leu Ala  
 275 280 285  
 Arg Gly Val Asn Glu Pro Leu Trp Leu Phe Thr Leu Ala Val Gln Ala  
 290 295 300

Asp  
 305

<210> 127  
 <211> 630  
 <212> DNA  
 <213> Aquifex aeolicus

<400> 127  
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gactgcgaag ccacagaact cgacgtaaag aaggcaaaac tcctttcaat aggtgcggtt 180  
 gaggttaaaa acctggaaat agacctctct aaatcttttt acgagatact caaaagtgac 240  
 gagataaagg cggcggagat acatggaata accaggggaag acgttgaaaa gtacggaaaag 300  
 gaaccaaagg aagtaatata cgactttctg aagtacataa agggaagcgt tctcgttggc 360  
 tactacgtga agtttgacgt ctcaactcgtt gagaagtact ccataaagta cttccagtat 420  
 ccaatcatca actacaagtt agacctgttt agtttcgtga agagagagta ccagagtggc 480  
 aggagtcttg acgaccttat gaaggaactc ggtgtagaaa taagggcaag gcacaacgcc 540  
 cttgaagatg cctacataac cgctcttctt ttcttaaagt acgtttaccc gaacagggag 600  
 tacagactaa aggatctccc gattttcctt 630

<210> 128

<211> 210

<212> PRT

<213> Aquifex aeolicus

<400> 128

Met	Asn	Phe	Leu	Lys	Lys	Phe	Leu	Leu	Leu	Arg	Lys	Ala	Gln	Lys	Ser	
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Pro	Tyr	Phe	Glu	Glu	Phe	Tyr	Glu	Glu	Ile	Asp	Leu	Asn	Gln	Lys	Val	
			20					25					30			
Lys	Asp	Ala	Arg	Phe	Val	Val	Phe	Asp	Cys	Glu	Ala	Thr	Glu	Leu	Asp	
		35					40					45				
Val	Lys	Lys	Ala	Lys	Leu	Leu	Ser	Ile	Gly	Ala	Val	Glu	Val	Lys	Asn	
	50				55					60						
Leu	Glu	Ile	Asp	Leu	Ser	Lys	Ser	Phe	Tyr	Glu	Ile	Leu	Lys	Ser	Asp	
65				70					75						80	
Glu	Ile	Lys	Ala	Ala	Glu	Ile	His	Gly	Ile	Thr	Arg	Glu	Asp	Val	Glu	
			85					90						95		
Lys	Tyr	Gly	Lys	Glu	Pro	Lys	Glu	Val	Ile	Tyr	Asp	Phe	Leu	Lys	Tyr	
		100					105						110			
Ile	Lys	Gly	Ser	Val	Leu	Val	Gly	Tyr	Tyr	Val	Lys	Phe	Asp	Val	Ser	
	115					120					125					
Leu	Val	Glu	Lys	Tyr	Ser	Ile	Lys	Tyr	Phe	Gln	Tyr	Pro	Ile	Ile	Asn	
	130					135				140						
Tyr	Lys	Leu	Asp	Leu	Phe	Ser	Phe	Val	Lys	Arg	Glu	Tyr	Gln	Ser	Gly	
145				150					155					160		
Arg	Ser	Leu	Asp	Asp	Leu	Met	Lys	Glu	Leu	Gly	Val	Glu	Ile	Arg	Ala	

165

170

175

Arg His Asn Ala Leu Glu Asp Ala Tyr Ile Thr Ala Leu Leu Phe Leu  
 180 185 190

Lys Tyr Val Tyr Pro Asn Arg Glu Tyr Arg Leu Lys Asp Leu Pro Ile  
 195 200 205

Phe Leu  
 210

&lt;210&gt; 129

&lt;211&gt; 526

&lt;212&gt; DNA

&lt;213&gt; Aquifex aeolicus

&lt;400&gt; 129

atgctcaata aggttttttat aataggaaga cttacgggtg accccggttat aacttatcta 60  
 ccgagcggaa cgcccgtagt agagtttact ctggcttaca acagaaggta taaaaaccag 120  
 aacggtgaat ttcaggagga aagtcacttc tttgacgtaa aggcgtacgg aaaaatggct 180  
 gaagactggg ctacacgctt ctcgaaagga tacctcgtag tcgtagaggg aagactctcc 240  
 caggaaaagt gggagaaaaga aggaaagaag ttctcaaagg tcaggataat agcggaaaac 300  
 gtaagattaa taaacaggcc gaaagggtgct gaacttcaag cagaagaaga ggaggaagtt 360  
 cctcccattg aggaggaaat tgaaaaactc ggtaaagagg aagagaagcc ttttaccgat 420  
 gaagaggacg aaataccttt ttaattttga ggagggttaa gtatggtagt gagagctcct 480  
 aagaagaaag tttgtatgta ctgtgaacaa aagagagagc cagatt 526

&lt;210&gt; 130

&lt;211&gt; 147

&lt;212&gt; PRT

&lt;213&gt; Aquifex aeolicus

&lt;400&gt; 130

Met Leu Asn Lys Val Phe Ile Ile Gly Arg Leu Thr Gly Asp Pro Val  
 1 5 10 15

Ile Thr Tyr Leu Pro Ser Gly Thr Pro Val Val Glu Phe Thr Leu Ala  
 20 25 30

Tyr Asn Arg Arg Tyr Lys Asn Gln Asn Gly Glu Phe Gln Glu Glu Ser  
 35 40 45

His Phe Phe Asp Val Lys Ala Tyr Gly Lys Met Ala Glu Asp Trp Ala  
 50 55 60

Thr Arg Phe Ser Lys Gly Tyr Leu Val Leu Val Glu Gly Arg Leu Ser

65

70

75

80

Gln Glu Lys Trp Glu Lys Glu Gly Lys Lys Phe Ser Lys Val Arg Ile  
85 90 95

Ile Ala Glu Asn Val Arg Leu Ile Asn Arg Pro Lys Gly Ala Glu Leu  
100 105 110

Gln Ala Glu Glu Glu Glu Glu Val Pro Pro Ile Glu Glu Glu Ile Glu  
115 120 125

Lys Leu Gly Lys Glu Glu Glu Lys Pro Phe Thr Asp Glu Glu Asp Glu  
130 135 140

Ile Pro Phe  
145

<210> 131

<211> 1472

<212> DNA

<213> Aquifex aeolicus

<400> 131

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tgcataagac agcacaagct acttttcagg gttctta'caa acctctgggtc cgagtacggc 180  
aataagctcg atttcgtatt aataaaggat caccttgaaa agaaaaactt actccagaaa 240  
atacctatag actggctcga agaactctac gaggaggcgg tatcccctga cagccttgag 300  
gaagtctgca aaatagtaaa acaacgttcc gcacagaggg cgataattca actcgggtata 360  
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agcaggatat tttccatagc ggaaagtgtc acatctacgc agttttacca tgtgaaagac 480  
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ttaataatac tcgccgcaag acccggtatg gggaaaaccg cctttatgct ctccataatc 660  
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gaacagctcg ttatgagact cctctctatg atgtcggagg tcccactttt caagataaag 780  
tctggaagta tatcgaatga agatttaaag aagcttgaag caagcgcaat agaactcgca 840  
aagtacgaca tatacctcga cgacacaccc gctctcacta caacggattt aaggataaag 900  
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ctgagaccgc cagtccgaaa gagttcaaga caggaggaag tggcagaggt ttcaagaaac 1020  
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gaggtggaaa agaggagtga taaaagaccc cagcttgagg acctcagaga atccggacag 1140  
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ccaaatcccg aagagcaggg tatagcggaa gtgataatag ccaagcaaag gcaaggaccc 1260  
acggacattg tgaagctcgc atttattaag gagtacacta agtttgcaaa cctagaagcc 1320  
cttcctgaac aacctcctga agaagaggaa ctttccgaaa ttattgaaac acaggaggat 1380  
gaaggattcg aagatattga cttctgaaaa ttaagggtttt ataattttat cttggctatc 1440



cggggtagct caatcggcag agcgggtggc tg

1472

<210> 132

<211> 438

<212> PRT

<213> Aquifex aeolicus

<400> 132

Met Gln Phe Val Asp Lys Leu Pro Cys Asp Glu Ser Ala Glu Arg Ala  
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Val Leu Gly Ser Met Leu Glu Asp Pro Glu Asn Ile Pro Leu Val Leu  
20 25 30

Glu Tyr Leu Lys Glu Glu Asp Phe Cys Ile Asp Glu His Lys Leu Leu  
35 40 45

Phe Arg Val Leu Thr Asn Leu Trp Ser Glu Tyr Gly Asn Lys Leu Asp  
50 55 60

Phe Val Leu Ile Lys Asp His Leu Glu Lys Lys Asn Leu Leu Gln Lys  
65 70 75 80

Ile Pro Ile Asp Trp Leu Glu Glu Leu Tyr Glu Glu Ala Val Ser Pro  
85 90 95

Asp Thr Leu Glu Glu Val Cys Lys Ile Val Lys Gln Arg Ser Ala Gln  
100 105 110

Arg Ala Ile Ile Gln Leu Gly Ile Thr Ser Thr Gln Phe Tyr His Val  
115 120 125

Lys Asp Val Ala Glu Glu Val Ile Glu Leu Ile Tyr Lys Phe Lys Ser  
130 135 140

Ser Asp Arg Leu Val Thr Gly Leu Pro Ser Gly Phe Thr Glu Leu Asp  
145 150 155 160

Leu Lys Thr Thr Gly Phe His Pro Gly Asp Leu Ile Ile Leu Ala Ala  
165 170 175

Arg Pro Gly Met Gly Lys Thr Ala Phe Met Leu Ser Ile Ile Tyr Asn  
180 185 190

Leu Ala Lys Asp Glu Gly Lys Pro Ser Ala Val Phe Ser Leu Glu Met  
195 200 205

Ser Lys Glu Gln Leu Val Met Arg Leu Leu Ser Met Met Ser Glu Val  
 210 215 220

Pro Leu Phe Lys Ile Arg Ser Gly Ser Ile Ser Asn Glu Asp Leu Lys  
 225 230 235 240

Lys Leu Glu Ala Ser Ala Ile Glu Leu Ala Lys Tyr Asp Ile Tyr Leu  
 245 250 255

Asp Asp Thr Pro Ala Leu Thr Thr Thr Asp Leu Arg Ile Arg Ala Arg  
 260 265 270

Lys Leu Arg Lys Glu Lys Glu Val Glu Phe Val Ala Val Asp Tyr Leu  
 275 280 285

Gln Leu Leu Arg Pro Pro Val Arg Lys Ser Ser Arg Gln Glu Glu Val  
 290 295 300

Ala Glu Val Ser Arg Asn Leu Lys Ala Leu Ala Lys Glu Leu His Ile  
 305 310 315 320

Pro Val Met Ala Leu Ala Gln Leu Ser Arg Glu Val Glu Lys Arg Ser  
 325 330 335

Asp Lys Arg Pro Gln Leu Ala Asp Leu Arg Glu Ser Gly Gln Ile Glu  
 340 345 350

Gln Asp Ala Asp Leu Ile Leu Phe Leu His Arg Pro Glu Tyr Tyr Lys  
 355 360 365

Lys Lys Pro Asn Pro Glu Glu Gln Gly Ile Ala Glu Val Ile Ile Ala  
 370 375 380

Lys Gln Arg Gln Gly Pro Thr Asp Ile Val Lys Leu Ala Phe Ile Lys  
 385 390 395 400

Glu Tyr Thr Lys Phe Ala Asn Leu Glu Ala Leu Pro Glu Gln Pro Pro  
 405 410 415

Glu Glu Glu Glu Leu Ser Glu Ile Ile Glu Thr Gln Glu Asp Glu Gly  
 420 425 430

Phe Glu Asp Ile Asp Phe  
 435

<210> 133

<211> 1526

09716964 112100

<212> DNA

<213> Aquifex aeolicus

<400> 133

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aacagagagg caagtgahta cgtaaagagt aggggaatag accctaaagt agcgaggaag 420
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ttcctgaaag gactgataga attaaaacca aaaatagacc ttgaagtcct gaacttaagt 1320
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actttaataa attttttagag ttagga 1526
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<210> 134

<211> 498

<212> PRT

<213> Aquifex aeolicus

<400> 134

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  1                   5                   10                   15

Val Ile Ser Glu Tyr Leu Asn Leu Glu Lys Val Gly Ser Asn Tyr Arg
      20                   25                   30

Thr Asn Cys Pro Phe His Pro Asp Asp Thr Pro Ser Phe Tyr Val Ser
      35                   40                   45

Pro Ser Lys Gln Ile Phe Lys Cys Phe Gly Cys Gly Val Gly Gly Asp
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50		55		60
Ala Ile Lys Phe Val Ser Leu Tyr Glu Asp Ile Ser Tyr Phe Glu Ala				
65		70		75
Ala Leu Glu Leu Ala Lys Arg Tyr Gly Lys Lys Leu Asp Leu Glu Lys				
	85		90	95
Ile Ser Lys Asp Glu Lys Val Tyr Val Ala Leu Asp Arg Val Cys Asp				
	100		105	110
Phe Tyr Arg Glu Ser Leu Leu Lys Asn Arg Glu Ala Ser Glu Tyr Val				
	115		120	125
Lys Ser Arg Gly Ile Asp Pro Lys Val Ala Arg Lys Phe Asp Leu Gly				
	130		135	140
Tyr Ala Pro Ser Ser Glu Ala Leu Val Lys Val Leu Lys Glu Asn Asp				
	145		150	155
Leu Leu Glu Ala Tyr Leu Glu Thr Lys Asn Leu Leu Ser Pro Thr Lys				
	165		170	175
Gly Val Tyr Arg Asp Leu Phe Leu Arg Arg Val Val Ile Pro Ile Lys				
	180		185	190
Asp Pro Arg Gly Arg Val Ile Gly Phe Gly Gly Arg Arg Ile Val Glu				
	195		200	205
Asp Lys Ser Pro Lys Tyr Ile Asn Ser Pro Asp Ser Arg Val Phe Lys				
	210		215	220
Lys Gly Glu Asn Leu Phe Gly Leu Tyr Glu Ala Lys Glu Tyr Ile Lys				
	225		230	235
Glu Glu Gly Phe Ala Ile Leu Val Glu Gly Tyr Phe Asp Leu Leu Arg				
	245		250	255
Leu Phe Ser Glu Gly Ile Arg Asn Val Val Ala Pro Leu Gly Thr Ala				
	260		265	270
Leu Thr Gln Asn Gln Ala Asn Leu Leu Ser Lys Phe Thr Lys Lys Val				
	275		280	285
Tyr Ile Leu Tyr Asp Gly Asp Asp Ala Gly Arg Lys Ala Met Lys Ser				
	290		295	300
Ala Ile Pro Leu Leu Leu Ser Ala Gly Val Glu Val Tyr Pro Val Tyr				

305                      310                      315                      320  
 Leu Pro Glu Gly Tyr Asp Pro Asp Glu Phe Ile Lys Glu Phe Gly Lys  
                                  325                      330                      335  
 Glu Glu Leu Arg Arg Leu Ile Asn Ser Ser Gly Glu Leu Phe Glu Thr  
                                  340                      345                      350  
 Leu Ile Lys Thr Ala Arg Glu Asn Leu Glu Glu Lys Thr Arg Glu Phe  
                                  355                      360                      365  
 Arg Tyr Tyr Leu Gly Phe Ile Ser Asp Gly Val Arg Arg Phe Ala Leu  
                                  370                      375                      380  
 Ala Ser Glu Phe His Thr Lys Tyr Lys Val Pro Met Glu Ile Leu Leu  
 385                      390                      395                      400  
 Met Lys Ile Glu Lys Asn Ser Gln Glu Lys Glu Ile Lys Leu Ser Phe  
                                  405                      410                      415  
 Lys Glu Lys Ile Phe Leu Lys Gly Leu Ile Glu Leu Lys Pro Lys Ile  
                                  420                      425                      430  
 Asp Leu Glu Val Leu Asn Leu Ser Pro Glu Leu Lys Glu Leu Ala Val  
                                  435                      440                      445  
 Asn Ala Leu Asn Gly Glu Glu His Leu Leu Pro Lys Glu Val Leu Glu  
                                  450                      455                      460  
 Tyr Gln Val Asp Asn Leu Glu Lys Leu Phe Asn Asn Ile Leu Arg Asp  
 465                      470                      475                      480  
 Leu Gln Lys Ser Gly Lys Lys Arg Lys Lys Arg Gly Leu Lys Asn Val  
                                  485                      490                      495  
 Asn Thr

<210> 135

<211> 705

<212> DNA

<213> Aquifex aeolicus

<400> 135

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 atcccaaaga ggtactggaa cgccaactta gacacttacc accccaagaa cgtatccag 180

aacagggcac ttttgacgat aagggtcttc gtccacaact tcaatcccga ggaagggaaa 240  
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<210> 136

<211> 235

<212> PRT

<213> Aquifex aeolicus

<400> 136

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			20					25					30		
Arg	Asp	Val	Asn	Arg	Glu	Leu	Asn	Ile	Pro	Lys	Arg	Tyr	Trp	Asn	Ala
		35					40					45			
Asn	Leu	Asp	Thr	Tyr	His	Pro	Lys	Asn	Val	Ser	Gln	Asn	Arg	Ala	Leu
	50					55					60				
Leu	Thr	Ile	Arg	Val	Phe	Val	His	Asn	Phe	Asn	Pro	Glu	Glu	Gly	Lys
65					70				75						80
Gly	Leu	Thr	Phe	Val	Gly	Ser	Pro	Gly	Val	Gly	Lys	Thr	His	Leu	Ala
				85					90					95	
Val	Ala	Thr	Leu	Lys	Ala	Ile	Tyr	Glu	Lys	Lys	Gly	Ile	Arg	Gly	Tyr
			100					105					110		
Phe	Phe	Asp	Thr	Lys	Asp	Leu	Ile	Phe	Arg	Leu	Lys	His	Leu	Met	Asp
		115					120					125			
Glu	Gly	Lys	Asp	Thr	Lys	Phe	Leu	Lys	Thr	Val	Leu	Asn	Ser	Pro	Val
	130					135					140				
Leu	Val	Leu	Asp	Asp	Leu	Gly	Ser	Glu	Arg	Leu	Ser	Asp	Trp	Gln	Arg
145					150					155					160
Glu	Leu	Ile	Ser	Tyr	Ile	Ile	Thr	Tyr	Arg	Tyr	Asn	Asn	Leu	Lys	Ser

165

170

175

Thr Ile Ile Thr Thr Asn Tyr Ser Leu Gln Arg Glu Glu Glu Ser Ser  
180 185 190

Val Arg Ile Ser Ala Asp Leu Ala Ser Arg Leu Gly Glu Asn Val Val  
195 200 205

Ser Lys Ile Tyr Glu Met Asn Glu Leu Leu Val Ile Lys Gly Ser Asp  
210 215 220

Leu Arg Lys Ser Lys Lys Leu Ser Thr Pro Ser  
225 230 235

<210> 137

<211> 4101

<212> DNA

<213> *Thermatoga maritima*

<400> 137

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caaccagaaa agagagaaga accaaagggt gaagaattga agatcgagga tgaaaaccac 480  
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aagaagatcg gtatcacgaa gcttttcagaa atggagaagt tgaaggatac gatagactac 1620

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acggaacagt tcacgctttt c 4101

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<210> 138

<211> 1367

<212> PRT

<213> *Thermatoga maritima*



<400> 138

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Leu Glu Ile Asp Pro Asp Ala Gly Val Val Leu Val Ser Val Glu Lys  
20 25 30

Phe Ser Glu Glu Ile Glu Asp Leu Val Arg Leu Leu Glu Lys Lys Thr  
35 40 45

Arg Phe Arg Val Ile Val Asn Gly Val Gln Lys Ser Asn Gly Asp Leu  
50 55 60

Arg Gly Lys Ile Leu Ser Leu Leu Asn Gly Asn Val Pro Tyr Ile Lys  
65 70 75 80

Asp Val Val Phe Glu Gly Asn Arg Leu Ile Leu Lys Val Leu Gly Asp  
85 90 95

Phe Ala Arg Asp Arg Ile Ala Ser Lys Leu Arg Ser Thr Lys Lys Gln  
100 105 110

Leu Asp Glu Leu Leu Pro Pro Gly Thr Glu Ile Met Leu Glu Val Val  
115 120 125

Glu Pro Pro Glu Asp Leu Leu Lys Lys Glu Val Pro Gln Pro Glu Lys  
130 135 140

Arg Glu Glu Pro Lys Gly Glu Glu Leu Lys Ile Glu Asp Glu Asn His  
145 150 155 160

Ile Phe Gly Gln Lys Pro Arg Lys Ile Val Phe Thr Pro Ser Lys Ile  
165 170 175

Phe Glu Tyr Asn Lys Lys Thr Ser Val Lys Gly Lys Ile Phe Lys Ile  
180 185 190

Glu Lys Ile Glu Gly Lys Arg Thr Val Leu Leu Ile Tyr Leu Thr Asp  
195 200 205

Gly Glu Asp Ser Leu Ile Cys Lys Val Phe Asn Asp Val Glu Lys Val  
210 215 220

Glu Gly Lys Val Ser Val Gly Asp Val Ile Val Ala Thr Gly Asp Leu  
225 230 235 240

Leu Leu Glu Asn Gly Glu Pro Thr Leu Tyr Val Lys Gly Ile Thr Lys

09716964-112100

09716964-112100

	245		250		255
Leu Pro Glu Ala Lys Arg Met Asp Lys Ser Pro Val Lys Arg Val Glu	260		265		270
Leu His Ala His Thr Lys Phe Ser Asp Gln Asp Ala Ile Thr Asp Val	275		280		285
Asn Glu Tyr Val Lys Arg Ala Lys Glu Trp Gly Phe Pro Ala Ile Ala	290		295		300
Leu Thr Asp His Gly Asn Val Gln Ala Ile Pro Tyr Phe Tyr Asp Ala	305		310		315
Ala Lys Glu Ala Gly Ile Lys Pro Ile Phe Gly Ile Glu Ala Tyr Leu	325		330		335
Val Ser Asp Val Glu Pro Val Ile Arg Asn Leu Ser Asp Asp Ser Thr	340		345		350
Phe Gly Asp Ala Thr Phe Val Val Leu Asp Phe Glu Thr Thr Gly Leu	355		360		365
Asp Pro Gln Val Asp Glu Ile Ile Glu Ile Gly Ala Val Lys Ile Gln	370		375		380
Gly Gly Gln Ile Val Asp Glu Tyr His Thr Leu Ile Lys Pro Ser Arg	385		390		395
Glu Ile Ser Arg Lys Ser Ser Glu Ile Thr Gly Ile Thr Gln Glu Met	405		410		415
Leu Glu Asn Lys Arg Ser Ile Glu Glu Val Leu Pro Glu Phe Leu Gly	420		425		430
Phe Leu Glu Asp Ser Ile Ile Val Ala His Asn Ala Asn Phe Asp Tyr	435		440		445
Arg Phe Leu Arg Leu Trp Ile Lys Lys Val Met Gly Leu Asp Trp Glu	450		455		460
Arg Pro Tyr Ile Asp Thr Leu Ala Leu Ala Lys Ser Leu Leu Lys Leu	465		470		475
Arg Ser Tyr Ser Leu Asp Ser Val Val Glu Lys Leu Gly Leu Gly Pro	485		490		495
Phe Arg His His Arg Ala Leu Asp Asp Ala Arg Val Thr Ala Gln Val					

500					505					510						
Phe	Leu	Arg	Phe	Val	Glu	Met	Met	Lys	Lys	Ile	Gly	Ile	Thr	Lys	Leu	
515					520					525						
Ser	Glu	Met	Glu	Lys	Leu	Lys	Asp	Thr	Ile	Asp	Tyr	Thr	Ala	Leu	Lys	
530					535					540						
Pro	Phe	His	Cys	Thr	Ile	Leu	Val	Gln	Asn	Lys	Lys	Gly	Leu	Lys	Asn	
545					550					555					560	
Leu	Tyr	Lys	Leu	Val	Ser	Asp	Ser	Tyr	Ile	Lys	Tyr	Phe	Tyr	Gly	Val	
565					570					575						
Pro	Arg	Ile	Leu	Lys	Ser	Glu	Leu	Ile	Glu	Asn	Arg	Glu	Gly	Leu	Leu	
580					585					590						
Val	Gly	Ser	Ala	Cys	Ile	Ser	Gly	Glu	Leu	Gly	Arg	Ala	Ala	Leu	Glu	
595					600					605						
Gly	Ala	Ser	Asp	Ser	Glu	Leu	Glu	Glu	Ile	Ala	Lys	Phe	Tyr	Asp	Tyr	
610					615					620						
Ile	Glu	Val	Met	Pro	Leu	Asp	Val	Ile	Ala	Glu	Asp	Glu	Glu	Asp	Leu	
625					630					635					640	
Asp	Arg	Glu	Arg	Leu	Lys	Glu	Val	Tyr	Arg	Lys	Leu	Tyr	Arg	Ile	Ala	
645					650					655						
Lys	Lys	Leu	Asn	Lys	Phe	Val	Val	Met	Thr	Gly	Asp	Val	His	Phe	Leu	
660					665					670						
Asp	Pro	Glu	Asp	Ala	Arg	Gly	Arg	Ala	Ala	Leu	Leu	Ala	Pro	Gln	Gly	
675					680					685						
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690					695					700						
Glu	Met	Leu	Glu	Lys	Ala	Ile	Glu	Ile	Phe	Glu	Asp	Glu	Glu	Ile	Ala	
705					710					715					720	
Arg	Glu	Val	Val	Ile	Glu	Asn	Pro	Asn	Arg	Ile	Ala	Asp	Met	Ile	Glu	
725					730					735						
Glu	Val	Gln	Pro	Leu	Glu	Lys	Lys	Leu	His	Pro	Pro	Ile	Ile	Glu	Asn	
740					745					750						
Ala	Asp	Glu	Ile	Val	Arg	Asn	Leu	Thr	Met	Lys	Arg	Ala	Tyr	Glu	Ile	

755

760

765

Tyr Gly Asp Pro Leu Pro Glu Ile Val Gln Lys Arg Val Glu Lys Glu  
770 775 780

Leu Asn Ala Ile Ile Asn His Gly Tyr Ala Val Leu Tyr Leu Ile Ala  
785 790 795 800

Gln Glu Leu Val Gln Lys Ser Met Ser Asp Gly Tyr Val Val Gly Ser  
805 810 815

Arg Gly Ser Val Gly Ser Ser Leu Val Ala Asn Leu Leu Gly Ile Thr  
820 825 830

Glu Val Asn Pro Leu Pro Pro His Tyr Arg Cys Pro Glu Cys Lys Tyr  
835 840 845

Phe Glu Val Val Glu Asp Asp Arg Tyr Gly Ala Gly Tyr Asp Leu Pro  
850 855 860

Asn Lys Asn Cys Pro Arg Cys Gly Ala Pro Leu Arg Lys Asp Gly His  
865 870 875 880

Gly Ile Pro Phe Glu Thr Phe Met Gly Phe Glu Gly Asp Lys Val Pro  
885 890 895

Asp Ile Asp Leu Asn Phe Ser Gly Glu Tyr Gln Glu Arg Ala His Arg  
900 905 910

Phe Val Glu Glu Leu Phe Gly Lys Asp His Val Tyr Arg Ala Gly Thr  
915 920 925

Ile Asn Thr Ile Ala Glu Arg Ser Ala Val Gly Tyr Val Arg Ser Tyr  
930 935 940

Glu Glu Lys Thr Gly Lys Lys Leu Arg Lys Ala Glu Met Glu Arg Leu  
945 950 955 960

Val Ser Met Ile Thr Gly Val Lys Arg Thr Thr Gly Gln His Pro Gly  
965 970 975

Gly Leu Met Ile Ile Pro Lys Asp Lys Glu Val Tyr Asp Phe Thr Pro  
980 985 990

Ile Gln Tyr Pro Ala Asn Asp Arg Asn Ala Gly Val Phe Thr Thr His  
995 1000 1005

Phe Ala Tyr Glu Thr Ile His Asp Asp Leu Val Lys Ile Asp Ala Leu

1010

1015

1020

Gly His Asp Asp Pro Thr Phe Ile Lys Met Leu Lys Asp Leu Thr Gly  
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Ile Asp Pro Met Thr Ile Pro Met Asp Asp Pro Asp Thr Leu Ala Ile  
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Phe Ser Ser Val Lys Pro Leu Gly Val Asp Pro Val Glu Leu Glu Ser  
 1060 1065 1070

Asp Val Gly Thr Tyr Gly Ile Pro Glu Phe Gly Thr Glu Phe Val Arg  
 1075 1080 1085

Gly Met Leu Val Glu Thr Arg Pro Lys Ser Phe Ala Glu Leu Val Arg  
 1090 1095 1100

Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp Leu Asn Asn Ala Arg  
 1105 1110 1115 1120

Asp Trp Ile Asn Leu Gly Tyr Ala Lys Leu Ser Glu Val Ile Ser Cys  
 1125 1130 1135

Arg Asp Asp Ile Met Asn Phe Leu Ile His Lys Gly Met Glu Pro Ser  
 1140 1145 1150

Leu Ala Phe Lys Ile Met Glu Asn Val Arg Lys Gly Lys Gly Ile Thr  
 1155 1160 1165

Glu Glu Met Glu Ser Glu Met Arg Arg Leu Lys Val Pro Glu Trp Phe  
 1170 1175 1180

Ile Glu Ser Cys Lys Arg Ile Lys Tyr Leu Phe Pro Lys Ala His Ala  
 1185 1190 1195 1200

Val Ala Tyr Val Ser Met Ala Phe Arg Ile Ala Tyr Phe Lys Val His  
 1205 1210 1215

Tyr Pro Leu Gln Phe Tyr Ala Ala Tyr Phe Thr Ile Lys Gly Asp Gln  
 1220 1225 1230

Phe Asp Pro Val Leu Val Leu Arg Gly Lys Glu Ala Ile Lys Arg Arg  
 1235 1240 1245

Leu Arg Glu Leu Lys Ala Met Pro Ala Lys Asp Ala Gln Lys Lys Asn  
 1250 1255 1260

Glu Val Ser Val Leu Glu Val Ala Leu Glu Met Ile Leu Arg Gly Phe

1265                      1270                      1275                      1280

Ser Phe Leu Pro Pro Asp Ile Phe Lys Ser Asp Ala Lys Lys Phe Leu  
                                  1285                      1290                      1295

Ile Glu Gly Asn Ser Leu Arg Ile Pro Phe Asn Lys Leu Pro Gly Leu  
                                  1300                      1305                      1310

Gly Asp Ser Val Ala Glu Ser Ile Ile Arg Ala Arg Glu Glu Lys Pro  
                                  1315                      1320                      1325

Phe Thr Ser Val Glu Asp Leu Met Lys Arg Thr Lys Val Asn Lys Asn  
                                  1330                      1335                      1340

His Ile Glu Leu Met Lys Ser Leu Gly Val Leu Gly Asp Leu Pro Glu  
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Thr Glu Gln Phe Thr Leu Phe  
                                  1365

<210> 139  
 <211> 567  
 <212> DNA  
 <213> *Thermatoga maritima*

<400> 139  
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 aagatctaca gaaacaaagc gtttcaactct ctcgtgaatc ccagaataag aatccctgcg 180  
 ctgattcaga aagttcacgg tatcagcaac atggacatcg tggaagcgcc agacatggac 240  
 acagtttacg atcttttcag ggattacgtg aagggaacgg tgctcgtgtt tcacaacgcc 300  
 aacttcgacc tcacttttct ggatatgatg gcaaaggaaa cgggaaactt tccaataacg 360  
 aatccctaca tcgacacact cgatctttca gaagagatct ttggaaggcc tcattctctc 420  
 aaatggctct ccgaaagact tggaataaaa accacgatac ggcaccgtgc tcttcagat 480  
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 aacgaattca tacgtggaaa acggggg                      567

<210> 140  
 <211> 189  
 <212> PRT  
 <213> *Thermatoga maritima*

<400> 140  
 Met Leu Ala Met Ile Trp Asn Asp Thr Val Phe Cys Val Val Asp Thr  
                                  1                      5                      10                      15

Glu Thr Thr Gly Thr Asp Pro Phe Ala Gly Asp Arg Ile Val Glu Ile  
                   20                                  25                                  30  
 Ala Ala Val Pro Val Phe Lys Gly Lys Ile Tyr Arg Asn Lys Ala Phe  
                   35                                  40                                  45  
 His Ser Leu Val Asn Pro Arg Ile Arg Ile Pro Ala Leu Ile Gln Lys  
                   50                                  55                                  60  
 Val His Gly Ile Ser Asn Met Asp Ile Val Glu Ala Pro Asp Met Asp  
                   65                                  70                                  75                                  80  
 Thr Val Tyr Asp Leu Phe Arg Asp Tyr Val Lys Gly Thr Val Leu Val  
                                   85                                  90                                  95  
 Phe His Asn Ala Asn Phe Asp Leu Thr Phe Leu Asp Met Met Ala Lys  
                                   100                                  105                                  110  
 Glu Thr Gly Asn Phe Pro Ile Thr Asn Pro Tyr Ile Asp Thr Leu Asp  
                   115                                  120                                  125  
 Leu Ser Glu Glu Ile Phe Gly Arg Pro His Ser Leu Lys Trp Leu Ser  
                   130                                  135                                  140  
 Glu Arg Leu Gly Ile Lys Thr Thr Ile Arg His Arg Ala Leu Pro Asp  
                   145                                  150                                  155                                  160  
 Ala Leu Val Thr Ala Arg Val Phe Val Lys Leu Val Glu Phe Leu Gly  
                                   165                                  170                                  175  
 Glu Asn Arg Val Asn Glu Phe Ile Arg Gly Lys Arg Gly  
                                   180                                  185

<210> 141

<211> 1434

<212> DNA

<213> *Thermatoga maritima*

<400> 141

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 ttcgccggtc cgaggggaac ggggaagact actcttgcca gaattctcgc aaaatccctg 180  
 aactgtgaga acagaaaggg agttgaaccc tgcaattcct gcagagcctg cagagagata 240  
 gacgagggaa ccttcatgga cgtgatagag ctgcacgcgg cctccaacag aggaatagac 300  
 gagatcagaa gaatcagaga cgccgttgga tacaggccga tggaaggtaa atacaaagtc 360  
 tacataatag acgaagtcca catgctcagc aaagaagcct tcaacgcgct cctcaaaaca 420  
 ctcgaagaac ctccttccca cgtcgtgttc gtgctggcaa cgacaaacct tgagaagggt 480

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cctcccacga ttatctcgag atgtcagggt ttcgagttca gaaacattcc cgacgagctc 540
atcgaaaaga ggctccagga agttgaggag gctgaaggaa tagagataga caggggaagct 600
ctgagcttca tcgcaaaaag agcctctgga ggcttgagag acgcgctcac catgctcgag 660
caggtgtgga agttctcgga aggaaagata gatctcgaga cggtagacag ggcgctcggg 720
ttgataccga tacagggtgt tcgcgattac gtgaacgcta tcttttctgg tgatgtgaaa 780
agggtcttca ccgttctcga cgacgtctat tacagcggga aggactacga ggtgctcatt 840
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tcagcgaacg atatagttca ggtttcgaga caacttctga atcttctgag agagataaaag 960
ttcgccgaag aaaaacgact cgtctgtaaa gtgggttcgg cttacatagc gacgaggttc 1020
tccaccacaa acgttcagga aaacgatgtc agagaaaaaa acgataattc aaatgtacag 1080
cagaaagaag agaagaaaga aacggtgaag gcaaaagaag aaaaacagga agacagcgag 1140
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tttgtcgctc tcagcctctc agaggtgcag tttgacggag aaaaggtgat tatttctttt 1260
gattcatcga aagctatgca ttacgagttg atgaagaaaa aactgcctga gctggaaaaac 1320
attttttcta gaaaactcgg gaaaaaagta gaagttgaac ttcgactgat gggaaaagaa 1380
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<210> 142

<211> 478

<212> PRT

<213> *Thermatoga maritima*

<400> 142

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Met Glu Val Leu Tyr Arg Lys Tyr Arg Pro Lys Thr Phe Ser Glu Val
  1                      5                      10                      15

Val Asn Gln Asp His Val Lys Lys Ala Ile Ile Gly Ala Ile Gln Lys
          20                      25                      30

Asn Ser Val Ala His Gly Tyr Ile Phe Ala Gly Pro Arg Gly Thr Gly
      35                      40                      45

Lys Thr Thr Leu Ala Arg Ile Leu Ala Lys Ser Leu Asn Cys Glu Asn
      50                      55                      60

Arg Lys Gly Val Glu Pro Cys Asn Ser Cys Arg Ala Cys Arg Glu Ile
      65                      70                      75                      80

Asp Glu Gly Thr Phe Met Asp Val Ile Glu Leu Asp Ala Ala Ser Asn
          85                      90                      95

Arg Gly Ile Asp Glu Ile Arg Arg Ile Arg Asp Ala Val Gly Tyr Arg
      100                      105                      110

Pro Met Glu Gly Lys Tyr Lys Val Tyr Ile Ile Asp Glu Val His Met
      115                      120                      125

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Leu Thr Lys Glu Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro  
 130 135 140  
 Pro Ser His Val Val Phe Val Leu Ala Thr Thr Asn Leu Glu Lys Val  
 145 150 155 160  
 Pro Pro Thr Ile Ile Ser Arg Cys Gln Val Phe Glu Phe Arg Asn Ile  
 165 170 175  
 Pro Asp Glu Leu Ile Glu Lys Arg Leu Gln Glu Val Ala Glu Ala Glu  
 180 185 190  
 Gly Ile Glu Ile Asp Arg Glu Ala Leu Ser Phe Ile Ala Lys Arg Ala  
 195 200 205  
 Ser Gly Gly Leu Arg Asp Ala Leu Thr Met Leu Glu Gln Val Trp Lys  
 210 215 220  
 Phe Ser Glu Gly Lys Ile Asp Leu Glu Thr Val His Arg Ala Leu Gly  
 225 230 235 240  
 Leu Ile Pro Ile Gln Val Val Arg Asp Tyr Val Asn Ala Ile Phe Ser  
 245 250 255  
 Gly Asp Val Lys Arg Val Phe Thr Val Leu Asp Asp Val Tyr Tyr Ser  
 260 265 270  
 Gly Lys Asp Tyr Glu Val Leu Ile Gln Glu Ala Val Glu Asp Leu Val  
 275 280 285  
 Glu Asp Leu Glu Arg Glu Arg Gly Val Tyr Gln Val Ser Ala Asn Asp  
 290 295 300  
 Ile Val Gln Val Ser Arg Gln Leu Leu Asn Leu Leu Arg Glu Ile Lys  
 305 310 315 320  
 Phe Ala Glu Glu Lys Arg Leu Val Cys Lys Val Gly Ser Ala Tyr Ile  
 325 330 335  
 Ala Thr Arg Phe Ser Thr Thr Asn Val Gln Glu Asn Asp Val Arg Glu  
 340 345 350  
 Lys Asn Asp Asn Ser Asn Val Gln Gln Lys Glu Glu Lys Lys Glu Thr  
 355 360 365  
 Val Lys Ala Lys Glu Glu Lys Gln Glu Asp Ser Glu Phe Glu Lys Arg  
 370 375 380

Phe Lys Glu Leu Met Glu Glu Leu Lys Glu Lys Gly Asp Leu Ser Ile  
385 390 395 400

Phe Val Ala Leu Ser Leu Ser Glu Val Gln Phe Asp Gly Glu Lys Val  
405 410 415

Ile Ile Ser Phe Asp Ser Ser Lys Ala Met His Tyr Glu Leu Met Lys  
420 425 430

Lys Lys Leu Pro Glu Leu Glu Asn Ile Phe Ser Arg Lys Leu Gly Lys  
435 440 445

Lys Val Glu Val Glu Leu Arg Leu Met Gly Lys Glu Glu Thr Ile Glu  
450 455 460

Lys Val Ser Gln Lys Ile Leu Arg Leu Phe Glu Gln Glu Gly  
465 470 475

<210> 143

<211> 1098

<212> DNA

<213> *Thermatoga maritima*

<400> 143

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ctcgcaaaga aatccgtgaa acccattctt gctggatttc ttttcgaagt gaaagatgga 120
aatttctaca tctgcgcgac cgatctcgag accggagtca aagcaaccgt gaatgccgct 180
gaaatctccg gtgaggcacg ttttgtggta ccaggagatg tcattcagaa gatggtcaag 240
gttctcccag atgagataac ggaactttct ttagaggggg atgctcttgt tataagttct 300
ggaagcaccg ttttcaggat caccaccatg cccgcggacg aatttccaga gataacgcct 360
gccgagtctg gaataacctt cgaagttgac acttcgctcc tcgaggaaat ggttgaaaag 420
gtcatcttcg ccgctgccaa agacgagttc atgcgaaatc tgaatggagt tttctgggaa 480
ctccacaaga atcttctcag gctgggtgca agtgatgggt tcagacttgc acttgctgaa 540
gagcagatag aaaacgagga agaggcgagt ttcttgctct ctttgaagag catgaaagaa 600
gttcaaaacg tgctggacaa cacaacggag ccgactataa cggtgaggta cgatggaaga 660
agggtttctc tgctgacaaa tgatgtagaa acggtgatga gagtggtcga cgctgaattt 720
cccgattaca aaagggatgat ccccgaaact ttcaaaacga aagtgggtgt ttccagaaaa 780
gaactcaggg aatctttgaa gaggggtgat gtgattgcca gcaagggaag cgagtccgtg 840
aagttcgaaa tagaagaaaa cgttatgaga cttgtgagca agagcccgga ttatggagaa 900
gtgggtcgatg aagttgaagt tcaaaaagaa ggggaagatc tcgtgatcgc tttcaaccgg 960
aagttcatcg aggacgtttt gaagcacatt gagactgaag aaatcgaaat gaacttcgtt 1020
gattctacca gtccatgtca gataaatcca ctcgatattt ctggatacct ttacatagtg 1080
atgcccataca gactggca
1098

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<210> 144

<211> 366

<212> PRT

<213> *Thermatoga maritima*

<400> 144

Met Lys Val Thr Val Thr Thr Leu Glu Leu Lys Asp Lys Ile Thr Ile  
1 5 10 15

Ala Ser Lys Ala Leu Ala Lys Lys Ser Val Lys Pro Ile Leu Ala Gly  
20 25 30

Phe Leu Phe Glu Val Lys Asp Gly Asn Phe Tyr Ile Cys Ala Thr Asp  
35 40 45

Leu Glu Thr Gly Val Lys Ala Thr Val Asn Ala Ala Glu Ile Ser Gly  
50 55 60

Glu Ala Arg Phe Val Val Pro Gly Asp Val Ile Gln Lys Met Val Lys  
65 70 75 80

Val Leu Pro Asp Glu Ile Thr Glu Leu Ser Leu Glu Gly Asp Ala Leu  
85 90 95

Val Ile Ser Ser Gly Ser Thr Val Phe Arg Ile Thr Thr Met Pro Ala  
100 105 110

Asp Glu Phe Pro Glu Ile Thr Pro Ala Glu Ser Gly Ile Thr Phe Glu  
115 120 125

Val Asp Thr Ser Leu Leu Glu Glu Met Val Glu Lys Val Ile Phe Ala  
130 135 140

Ala Ala Lys Asp Glu Phe Met Arg Asn Leu Asn Gly Val Phe Trp Glu  
145 150 155 160

Leu His Lys Asn Leu Leu Arg Leu Val Ala Ser Asp Gly Phe Arg Leu  
165 170 175

Ala Leu Ala Glu Glu Gln Ile Glu Asn Glu Glu Glu Ala Ser Phe Leu  
180 185 190

Leu Ser Leu Lys Ser Met Lys Glu Val Gln Asn Val Leu Asp Asn Thr  
195 200 205

Thr Glu Pro Thr Ile Thr Val Arg Tyr Asp Gly Arg Arg Val Ser Leu  
210 215 220

Ser Thr Asn Asp Val Glu Thr Val Met Arg Val Val Asp Ala Glu Phe  
225 230 235 240

Pro Asp Tyr Lys Arg Val Ile Pro Glu Thr Phe Lys Thr Lys Val Val  
 245 250 255

Val Ser Arg Lys Glu Leu Arg Glu Ser Leu Lys Arg Val Met Val Ile  
 260 265 270

Ala Ser Lys Gly Ser Glu Ser Val Lys Phe Glu Ile Glu Glu Asn Val  
 275 280 285

Met Arg Leu Val Ser Lys Ser Pro Asp Tyr Gly Glu Val Val Asp Glu  
 290 295 300

Val Glu Val Gln Lys Glu Gly Glu Asp Leu Val Ile Ala Phe Asn Pro  
 305 310 315 320

Lys Phe Ile Glu Asp Val Leu Lys His Ile Glu Thr Glu Glu Ile Glu  
 325 330 335

Met Asn Phe Val Asp Ser Thr Ser Pro Cys Gln Ile Asn Pro Leu Asp  
 340 345 350

Ile Ser Gly Tyr Leu Tyr Ile Val Met Pro Ile Arg Leu Ala  
 355 360 365

<210> 145

<211> 972

<212> DNA

<213> *Thermatoga maritima*

<400> 145

atgccagtca cgttttctcac aggtactgca gaaactcaga aggaagaatt gataaagaaa 60  
 ctccctgaagg atggtaacgt ggagtacata aggatccatc cggaggatcc cgacaagatc 120  
 gatttcataa ggtctttact caggacaaag acgatctttt ccaacaagac gatcattgac 180  
 atcgtcaatt tcgatgagtg gaaagcacag gagcagaagc gtctcgttga acttttgaaa 240  
 aacgtaccgg aagacgttca tatcttcatc cgttctcaaa aaacaggtgg aaagggagta 300  
 gcgctggagc ttccgaagcc atgggaaacg gacaagtggc ttgagtggat agaaaagcgc 360  
 ttcagggaga atggtttgc tcatcgataaa gatgcccttc agctgttttt ctccaagggt 420  
 ggaacgaacg acctgatcat agaaagggag attgaaaaac tgaaagctta ttccgaggac 480  
 agaaagataa cggtagaaga cgtggaagag gtcggttttta cctatcagac tccgggatac 540  
 gatgatTTTT gctttgctgt ttccgaagga aaaaggaagc tcgctcactc tcttctgtcg 600  
 cagctgtgga aaaccacaga gtccgtggtg attgccactg tccttgcgaa tcacttcttg 660  
 gatctcttca aaatcctcgt tcttgtgaca aagaaaagat actacacctg gcctgatgtg 720  
 tccaggtgtg ccaaagagct gggaattccc gttcctcgtg tggctcgttt cctcggtttc 780  
 tcctttaaga cctggaaatt caaggtgatg aaccacctcc tctactacga tgtgaagaag 840  
 gttagaaaga tactgagga tctctacgat ctggacagag ccgtgaaaag cgaagaagat 900  
 ccaaaaccgt tcttccacga gttcatagaa gaggtggcac tggatgtata ttctcttcag 960

&lt;210&gt; 146

&lt;211&gt; 324

&lt;212&gt; PRT

<213> *Thermatoga maritima*

&lt;400&gt; 146

Met Pro Val Thr Phe Leu Thr Gly Thr Ala Glu Thr Gln Lys Glu Glu  
 1 5 10 15

Leu Ile Lys Lys Leu Leu Lys Asp Gly Asn Val Glu Tyr Ile Arg Ile  
 20 25 30

His Pro Glu Asp Pro Asp Lys Ile Asp Phe Ile Arg Ser Leu Leu Arg  
 35 40 45

Thr Lys Thr Ile Phe Ser Asn Lys Thr Ile Ile Asp Ile Val Asn Phe  
 50 55 60

Asp Glu Trp Lys Ala Gln Glu Gln Lys Arg Leu Val Glu Leu Leu Lys  
 65 70 75 80

Asn Val Pro Glu Asp Val His Ile Phe Ile Arg Ser Gln Lys Thr Gly  
 85 90 95

Gly Lys Gly Val Ala Leu Glu Leu Pro Lys Pro Trp Glu Thr Asp Lys  
 100 105 110

Trp Leu Glu Trp Ile Glu Lys Arg Phe Arg Glu Asn Gly Leu Leu Ile  
 115 120 125

Asp Lys Asp Ala Leu Gln Leu Phe Phe Ser Lys Val Gly Thr Asn Asp  
 130 135 140

Leu Ile Ile Glu Arg Glu Ile Glu Lys Leu Lys Ala Tyr Ser Glu Asp  
 145 150 155 160

Arg Lys Ile Thr Val Glu Asp Val Glu Glu Val Val Phe Thr Tyr Gln  
 165 170 175

Thr Pro Gly Tyr Asp Asp Phe Cys Phe Ala Val Ser Glu Gly Lys Arg  
 180 185 190

Lys Leu Ala His Ser Leu Leu Ser Gln Leu Trp Lys Thr Thr Glu Ser  
 195 200 205

Val Val Ile Ala Thr Val Leu Ala Asn His Phe Leu Asp Leu Phe Lys  
 210 215 220

Ile Leu Val Leu Val Thr Lys Lys Arg Tyr Tyr Thr Trp Pro Asp Val  
 225 230 235 240

Ser Arg Val Ser Lys Glu Leu Gly Ile Pro Val Pro Arg Val Ala Arg  
 245 250 255

Phe Leu Gly Phe Ser Phe Lys Thr Trp Lys Phe Lys Val Met Asn His  
 260 265 270

Leu Leu Tyr Tyr Asp Val Lys Lys Val Arg Lys Ile Leu Arg Asp Leu  
 275 280 285

Tyr Asp Leu Asp Arg Ala Val Lys Ser Glu Glu Asp Pro Lys Pro Phe  
 290 295 300

Phe His Glu Phe Ile Glu Glu Val Ala Leu Asp Val Tyr Ser Leu Gln  
 305 310 315 320

Arg Asp Glu Glu

<210> 147

<211> 936

<212> DNA

<213> *Thermatoga maritima*

<400> 147

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 gtatcccttg aacttccga gtacgtggag aaatttcccc cgaaggcctc ggatgttctg 180  
 gagatagatc ccgaggggga gaacatagga atagacgaca tcagaacgat aaaggacttc 240  
 ctgaactaca gccccgagct ctacacgaga aagtacgtga tagtccacga ctgtgaaaga 300  
 atgaccagc aggcggcgaa cgcgtttctg aaggcccttg aagaaccacc agaatacgtc 360  
 gtgatcgctc tgaacactcg ccgctggcat tatctactgc cgacgataaa gagccgagtg 420  
 ttcagagtgg ttgtgaacgt tccaaaggag ttcagagatc tcgtgaaaga gaaaatagga 480  
 gatctctggg aggaacttcc acttcttgag agagacttca aaacggctct cgaagcctac 540  
 aaacttggtg cggaaaaaact ttctggattg atggaaaagtc tcaaagtttt ggagacggaa 600  
 aaactcttga aaaaggctct tccaaaaggc ctcgaagggt atctcgcatg tagggagctc 660  
 ctggagagat tttcaaagggt ggaatcgaag gaattctttg cgctttttga tcaggtgact 720  
 aacacgataa caggaaaaga cgcgtttctt ttgatccaga gactgacaag aatcattctc 780  
 cacgaaaaca catgggaaag cgttgaagat caaaaaagcg tgtctttcct cgattcaatt 840  
 ctcagggtga agatagcgaa tctgaacaac aaactcactc tgatgaacat cctcgcgata 900  
 cacagagaga gaaagagagg tgtcaacgct tggagc 936

<210> 148

<211> 311

<212> PRT

<213> *Thermatoga maritima*

<400> 148

Met Asn Asp Leu Ile Arg Lys Tyr Ala Lys Asp Gln Leu Glu Thr Leu  
1 5 10 15

Lys Arg Ile Ile Glu Lys Ser Glu Gly Ile Ser Ile Leu Ile Asn Gly  
20 25 30

Glu Asp Leu Ser Tyr Pro Arg Glu Val Ser Leu Glu Leu Pro Glu Tyr  
35 40 45

Val Glu Lys Phe Pro Pro Lys Ala Ser Asp Val Leu Glu Ile Asp Pro  
50 55 60

Glu Gly Glu Asn Ile Gly Ile Asp Asp Ile Arg Thr Ile Lys Asp Phe  
65 70 75 80

Leu Asn Tyr Ser Pro Glu Leu Tyr Thr Arg Lys Tyr Val Ile Val His  
85 90 95

Asp Cys Glu Arg Met Thr Gln Gln Ala Ala Asn Ala Phe Leu Lys Ala  
100 105 110

Leu Glu Glu Pro Pro Glu Tyr Ala Val Ile Val Leu Asn Thr Arg Arg  
115 120 125

Trp His Tyr Leu Leu Pro Thr Ile Lys Ser Arg Val Phe Arg Val Val  
130 135 140

Val Asn Val Pro Lys Glu Phe Arg Asp Leu Val Lys Glu Lys Ile Gly  
145 150 155 160

Asp Leu Trp Glu Glu Leu Pro Leu Leu Glu Arg Asp Phe Lys Thr Ala  
165 170 175

Leu Glu Ala Tyr Lys Leu Gly Ala Glu Lys Leu Ser Gly Leu Met Glu  
180 185 190

Ser Leu Lys Val Leu Glu Thr Glu Lys Leu Leu Lys Lys Val Leu Ser  
195 200 205

Lys Gly Leu Glu Gly Tyr Leu Ala Cys Arg Glu Leu Leu Glu Arg Phe  
210 215 220

Ser Lys Val Glu Ser Lys Glu Phe Phe Ala Leu Phe Asp Gln Val Thr  
225 230 235 240

Asn Thr Ile Thr Gly Lys Asp Ala Phe Leu Leu Ile Gln Arg Leu Thr  
245 250 255

Arg Ile Ile Leu His Glu Asn Thr Trp Glu Ser Val Glu Asp Lys Ser  
260 265 270

Val Ser Phe Leu Asp Ser Ile Leu Arg Val Lys Ile Ala Asn Leu Asn  
275 280 285

Asn Lys Leu Thr Leu Met Asn Ile Leu Ala Ile His Arg Glu Arg Lys  
290 295 300

Arg Gly Val Asn Ala Trp Ser  
305 310

<210> 149

<211> 423

<212> DNA

<213> *Thermatoga maritima*

<400> 149

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aagaacgcgc cggacgacgc tcaaacgact gatttcttca ggatcgtcac ctttggaaga 180  
ctggcagagt tcgctagaac ctatctcacc aaaggaaggc tcgttctcgt cgaagggtgaa 240  
atgagaatga gaagatggga aacacccact ggagaaaaga gggatatctcc ggaggttggtc 300  
gcaaacggtg ttagattcat ggacagaaaa cctgctgaaa cagttagcga gactgaagag 360  
gagctggaaa taccggaaga agacttttcc agcgatacct tcagtgaaga tgaaccacca 420  
ttt 423

<210> 150

<211> 141

<212> PRT

<213> *Thermatoga maritima*

<400> 150

Met Ser Phe Phe Asn Lys Ile Ile Leu Ile Gly Arg Leu Val Arg Asp  
1 5 10 15

Pro Glu Glu Arg Tyr Thr Leu Ser Gly Thr Pro Val Thr Thr Phe Thr  
20 25 30



Ile Ala Val Asp Arg Val Pro Arg Lys Asn Ala Pro Asp Asp Ala Gln  
 35 40 45

Thr Thr Asp Phe Phe Arg Ile Val Thr Phe Gly Arg Leu Ala Glu Phe  
 50 55 60

Ala Arg Thr Tyr Leu Thr Lys Gly Arg Leu Val Leu Val Glu Gly Glu  
 65 70 75 80

Met Arg Met Arg Arg Trp Glu Thr Pro Thr Gly Glu Lys Arg Val Ser  
 85 90 95

Pro Glu Val Val Ala Asn Val Val Arg Phe Met Asp Arg Lys Pro Ala  
 100 105 110

Glu Thr Val Ser Glu Thr Glu Glu Glu Leu Glu Ile Pro Glu Glu Asp  
 115 120 125

Phe Ser Ser Asp Thr Phe Ser Glu Asp Glu Pro Pro Phe  
 130 135 140

<210> 151

<211> 1353

<212> DNA

<213> *Thermatoga maritima*

<400> 151

atgcgtgttc ccccgacaaa cttagaggcc gaagttgctg tgctcggaag catattgata 60  
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 aaacaccaac acatcttcag agcgatggaa gagctttacg acgaaggaaa accggtggac 180  
 gtgggtttccg tctgtgacaa gcttcaaagc atgggaaaac tcgaggaagt aggtggagat 240  
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 gagatcgtca aggaaaaatc cattctgagg aaactcattg agatctccag aaaaatctca 360  
 gaaagtgcct acatggaaga agatgtggag atcctgctcg acaacgcaga aaagatgac 420  
 ttcgagatct cagagatgaa aacgacaaaa tctacgatc atctgagagg catcatgcac 480  
 cgggtgtttg aaaacctgga gaacttcagg gaaagagcca accttataga acccggtgtg 540  
 ctcataacgg gactaccaac gggattcaaa agtctggaca aacagaccac agggttccac 600  
 agtccgatc tggtgataat agcagcgaga ccctccatgg gaaaaacctc cttcgcactc 660  
 tcaatagcga ggaacatggc tgtcaatttc gaaatccccg tcggaatatt cagtctcgag 720  
 atgtccaagg aacagctcgc tcaaagacta ctacagcatgg agtccggtgt ggatctttac 780  
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 aaactctaca aagcacccat agttgtggac gatgagtcac tctcgcgatcc gcgatcgttg 900  
 agggcaaaaag cgagaaggat gaaaaaagaa tacgatgtaa aagccatttt tctcgactat 960  
 ctccagctca tgcacctgaa aggaagaaaa gaaagcagac agcaggagat atccgagatc 1020  
 tcgagatctc tgaagctcct tgcgagggaa ctgcacatag tggatgtagc gctttcacag 1080  
 ctttcgaggg ccgtagaaca gagagaagac aaaagaccga ggctgagtga cctcagggaa 1140  
 tccggtgcga tagaacagga cgcagacaca gtcattctca tctacaggga ggaatattac 1200

aggagcaaaa aatccaaaga ggaaagcaag cttcacgaac ctcacgaagc tgaaatcata 1260  
 ataggtaaac agagaaacgg tcccgttgga acgatcactc tgatcttcga cccagaacg 1320  
 gttacgttcc atgaagtcga tgtggtgcat tca 1353

<210> 152

<211> 451

<212> PRT

<213> *Thermatoga maritima*

<400> 152

Met Arg Val Pro Pro His Asn Leu Glu Ala Glu Val Ala Val Leu Gly  
 1 5 10 15

Ser Ile Leu Ile Asp Pro Ser Val Ile Asn Asp Val Leu Glu Ile Leu  
 20 25 30

Ser His Glu Asp Phe Tyr Leu Lys Lys His Gln His Ile Phe Arg Ala  
 35 40 45

Met Glu Glu Leu Tyr Asp Glu Gly Lys Pro Val Asp Val Val Ser Val  
 50 55 60

Cys Asp Lys Leu Gln Ser Met Gly Lys Leu Glu Glu Val Gly Gly Asp  
 65 70 75 80

Leu Glu Val Ala Gln Leu Ala Glu Ala Val Pro Ser Ser Ala His Ala  
 85 90 95

Leu His Tyr Ala Glu Ile Val Lys Glu Lys Ser Ile Leu Arg Lys Leu  
 100 105 110

Ile Glu Ile Ser Arg Lys Ile Ser Glu Ser Ala Tyr Met Glu Glu Asp  
 115 120 125

Val Glu Ile Leu Leu Asp Asn Ala Glu Lys Met Ile Phe Glu Ile Ser  
 130 135 140

Glu Met Lys Thr Thr Lys Ser Tyr Asp His Leu Arg Gly Ile Met His  
 145 150 155 160

Arg Val Phe Glu Asn Leu Glu Asn Phe Arg Glu Arg Ala Asn Leu Ile  
 165 170 175

Glu Pro Gly Val Leu Ile Thr Gly Leu Pro Thr Gly Phe Lys Ser Leu  
 180 185 190

Asp Lys Gln Thr Thr Gly Phe His Ser Ser Asp Leu Val Ile Ile Ala

195	200	205
Ala Arg Pro Ser Met Gly Lys Thr Ser Phe Ala Leu Ser Ile Ala Arg 210 215 220		
Asn Met Ala Val Asn Phe Glu Ile Pro Val Gly Ile Phe Ser Leu Glu 225 230 235 240		
Met Ser Lys Glu Gln Leu Ala Gln Arg Leu Leu Ser Met Glu Ser Gly 245 250 255		
Val Asp Leu Tyr Ser Ile Arg Thr Gly Tyr Leu Asp Gln Glu Lys Trp 260 265 270		
Glu Arg Leu Thr Ile Ala Ala Ser Lys Leu Tyr Lys Ala Pro Ile Val 275 280 285		
Val Asp Asp Glu Ser Leu Leu Asp Pro Arg Ser Leu Arg Ala Lys Ala 290 295 300		
Arg Arg Met Lys Lys Glu Tyr Asp Val Lys Ala Ile Phe Val Asp Tyr 305 310 315 320		
Leu Gln Leu Met His Leu Lys Gly Arg Lys Glu Ser Arg Gln Gln Glu 325 330 335		
Ile Ser Glu Ile Ser Arg Ser Leu Lys Leu Leu Ala Arg Glu Leu Asp 340 345 350		
Ile Val Val Ile Ala Leu Ser Gln Leu Ser Arg Ala Val Glu Gln Arg 355 360 365		
Glu Asp Lys Arg Pro Arg Leu Ser Asp Leu Arg Glu Ser Gly Ala Ile 370 375 380		
Glu Gln Asp Ala Asp Thr Val Ile Phe Ile Tyr Arg Glu Glu Tyr Tyr 385 390 395 400		
Arg Ser Lys Lys Ser Lys Glu Glu Ser Lys Leu His Glu Pro His Glu 405 410 415		
Ala Glu Ile Ile Ile Gly Lys Gln Arg Asn Gly Pro Val Gly Thr Ile 420 425 430		
Thr Leu Ile Phe Asp Pro Arg Thr Val Thr Phe His Glu Val Asp Val 435 440 445		
Val His Ser		

<210> 153  
 <211> 1695  
 <212> DNA  
 <213> *Thermatoga maritima*

<400> 153  
 gtgattcctc gagaggtcat cgaggaaata aaagaaaagg ttgacatcgt agaggtcatt 60  
 tccgagtacg tgaatcttac ccgggtaggt tcctcctaca gggctctctg tccctttcat 120  
 tcagaaacca atccttcttt ctacgttcat ccgggtttga agatatacca ttgtttcggc 180  
 tgcggtgcga gtggagacgt catcaaattt cttcaagaaa tggaagggat cagtttccag 240  
 gaagcgctgg aaagacttgc caaaagagct gggattgac tttctctcta cagaacagaa 300  
 gggacttctg aatacggaaa atacattcgt ttgtacgaag aaacgtggaa aaggtagctc 360  
 aaagagctgg agaaatcgaa agaggcaaaa gactatttaa aaagcagagg cttctctgaa 420  
 gaagatatag caaagtccgg ctttgggtac gtccccaaga gatccagcat ctctatagaa 480  
 gttgcagaag gcatgaacat aacactggaa gaacttgta gatacggtat cgcgctgaaa 540  
 aagggtgatc gattcgttga tagattcgaa ggaagaatcg ttgttccaat aaagaacgac 600  
 agtggtcata ttgtggcttt tgggtggcgt gctctcggca acgaagaacc gaagtatttg 660  
 aactctccag agaccaggt tttttcgaag aagaagacc ttttctctt cgatgaggcg 720  
 aaaaaagtgg caaaagaggt tggttttttc gtcatcaccg aaggctactt cgacgcgctc 780  
 gcattcagaa aggatggaat accaacggcg gtcgctgttc ttggggcgag tctttcaaga 840  
 gaggcgattc taaaactttc ggcgtattcg aaaaacgtca tactgtgttt cgataatgac 900  
 aaagcaggct tcagagccac tctcaaattc ctcgaggatc tcctagacta cgaattcaac 960  
 gtgcttgtgg caacccccctc tccttcaaaa gaccagatg aactctttca gaaagaagga 1020  
 gaaggttcat tgaaaaagat gctgaaaaac tcgcttcgt tcgaatattt tctggtgacg 1080  
 gctggtgagg tcttctttga caggaacagc cccgcgggtg tgagatccta ctttctttc 1140  
 ctcaaagggtt ggggtccaaa gatgagaagg aaaggatatt tgaaacacat agaaaatctc 1200  
 gtgaatgagg tttcatcttc tctccagata ccagaaaacc agattttgaa cttttttgaa 1260  
 agcgacaggt ctaacactat gcctgttcat gagaccaagt cgtcaaagg tttacgatgag 1320  
 gggagaggac tggcttattt gtttttgaac tacgaggatt tgagggaaaa gattctggaa 1380  
 ctggacttag aggtactgga agataaaaac gcgaggaggt ttttcaagag agtctcactg 1440  
 ggagaagatt tgaacaaagt catagaaaac tcccaaaaag agctgaaaga ctggattttt 1500  
 gagacaatag aaagcattcc tcctccaaag gatcccgaga aattcctcgg tgacctctcc 1560  
 gaaaagttga aaatccgacg gatagagaga cgtatcgag aaatagatga tatgataaag 1620  
 aaagcttcaa acgatgaaga aaggcgtctt cttctctcta tgaaagtga tctcctcaga 1680  
 aaaataaaga ggagg 1695

<210> 154  
 <211> 565  
 <212> PRT  
 <213> *Thermatoga maritima*

<400> 154  
 Met Ile Pro Arg Glu Val Ile Glu Glu Ile Lys Glu Lys Val Asp Ile  
 1 5 10 15

Val	Glu	Val	Ile	Ser	Glu	Tyr	Val	Asn	Leu	Thr	Arg	Val	Gly	Ser	Ser	20	25	30
Tyr	Arg	Ala	Leu	Cys	Pro	Phe	His	Ser	Glu	Thr	Asn	Pro	Ser	Phe	Tyr	35	40	45
Val	His	Pro	Gly	Leu	Lys	Ile	Tyr	His	Cys	Phe	Gly	Cys	Gly	Ala	Ser	50	55	60
Gly	Asp	Val	Ile	Lys	Phe	Leu	Gln	Glu	Met	Glu	Gly	Ile	Ser	Phe	Gln	65	70	75
Glu	Ala	Leu	Glu	Arg	Leu	Ala	Lys	Arg	Ala	Gly	Ile	Asp	Leu	Ser	Leu	85	90	95
Tyr	Arg	Thr	Glu	Gly	Thr	Ser	Glu	Tyr	Gly	Lys	Tyr	Ile	Arg	Leu	Tyr	100	105	110
Glu	Glu	Thr	Trp	Lys	Arg	Tyr	Val	Lys	Glu	Leu	Glu	Lys	Ser	Lys	Glu	115	120	125
Ala	Lys	Asp	Tyr	Leu	Lys	Ser	Arg	Gly	Phe	Ser	Glu	Glu	Asp	Ile	Ala	130	135	140
Lys	Phe	Gly	Phe	Gly	Tyr	Val	Pro	Lys	Arg	Ser	Ser	Ile	Ser	Ile	Glu	145	150	155
Val	Ala	Glu	Gly	Met	Asn	Ile	Thr	Leu	Glu	Glu	Leu	Val	Arg	Tyr	Gly	165	170	175
Ile	Ala	Leu	Lys	Lys	Gly	Asp	Arg	Phe	Val	Asp	Arg	Phe	Glu	Gly	Arg	180	185	190
Ile	Val	Val	Pro	Ile	Lys	Asn	Asp	Ser	Gly	His	Ile	Val	Ala	Phe	Gly	195	200	205
Gly	Arg	Ala	Leu	Gly	Asn	Glu	Glu	Pro	Lys	Tyr	Leu	Asn	Ser	Pro	Glu	210	215	220
Thr	Arg	Tyr	Phe	Ser	Lys	Lys	Lys	Thr	Leu	Phe	Leu	Phe	Asp	Glu	Ala	225	230	235
Lys	Lys	Val	Ala	Lys	Glu	Val	Gly	Phe	Phe	Val	Ile	Thr	Glu	Gly	Tyr	245	250	255
Phe	Asp	Ala	Leu	Ala	Phe	Arg	Lys	Asp	Gly	Ile	Pro	Thr	Ala	Val	Ala	260	265	270

Val	Leu	Gly	Ala	Ser	Leu	Ser	Arg	Glu	Ala	Ile	Leu	Lys	Leu	Ser	Ala	275	280	285
Tyr	Ser	Lys	Asn	Val	Ile	Leu	Cys	Phe	Asp	Asn	Asp	Lys	Ala	Gly	Phe	290	295	300
Arg	Ala	Thr	Leu	Lys	Ser	Leu	Glu	Asp	Leu	Leu	Asp	Tyr	Glu	Phe	Asn	305	310	315
Val	Leu	Val	Ala	Thr	Pro	Ser	Pro	Tyr	Lys	Asp	Pro	Asp	Glu	Leu	Phe	325	330	335
Gln	Lys	Glu	Gly	Glu	Gly	Ser	Leu	Lys	Lys	Met	Leu	Lys	Asn	Ser	Arg	340	345	350
Ser	Phe	Glu	Tyr	Phe	Leu	Val	Thr	Ala	Gly	Glu	Val	Phe	Phe	Asp	Arg	355	360	365
Asn	Ser	Pro	Ala	Gly	Val	Arg	Ser	Tyr	Leu	Ser	Phe	Leu	Lys	Gly	Trp	370	375	380
Val	Gln	Lys	Met	Arg	Arg	Lys	Gly	Tyr	Leu	Lys	His	Ile	Glu	Asn	Leu	385	390	395
Val	Asn	Glu	Val	Ser	Ser	Ser	Leu	Gln	Ile	Pro	Glu	Asn	Gln	Ile	Leu	405	410	415
Asn	Phe	Phe	Glu	Ser	Asp	Arg	Ser	Asn	Thr	Met	Pro	Val	His	Glu	Thr	420	425	430
Lys	Ser	Ser	Lys	Val	Tyr	Asp	Glu	Gly	Arg	Gly	Leu	Ala	Tyr	Leu	Phe	435	440	445
Leu	Asn	Tyr	Glu	Asp	Leu	Arg	Glu	Lys	Ile	Leu	Glu	Leu	Asp	Leu	Glu	450	455	460
Val	Leu	Glu	Asp	Lys	Asn	Ala	Arg	Glu	Phe	Phe	Lys	Arg	Val	Ser	Leu	465	470	475
Gly	Glu	Asp	Leu	Asn	Lys	Val	Ile	Glu	Asn	Phe	Pro	Lys	Glu	Leu	Lys	485	490	495
Asp	Trp	Ile	Phe	Glu	Thr	Ile	Glu	Ser	Ile	Pro	Pro	Pro	Lys	Asp	Pro	500	505	510
Glu	Lys	Phe	Leu	Gly	Asp	Leu	Ser	Glu	Lys	Leu	Lys	Ile	Arg	Arg	Ile	515	520	525

Glu Arg Arg Ile Ala Glu Ile Asp Asp Met Ile Lys Lys Ala Ser Asn  
530 535 540

Asp Glu Glu Arg Arg Leu Leu Leu Ser Met Lys Val Asp Leu Leu Arg  
545 550 555 560

Lys Ile Lys Arg Arg  
565

<210> 155

<211> 804

<212> DNA

<213> Thermus thermophilus

<400> 155

atggctctac acccggtca ccctggggca ataatcgggc acgaggccgt tctcgccctc 60  
cttccccgcc tcaccgcca gacctgctc ttctccggcc ccgagggggg ggggcggcgc 120  
accgtggccc gctggtacgc ctggggggctc aaccgcggct tccccccgcc ctccctgggg 180  
gagcacccgg acgtcctcga ggtggggccc aaggccccgg acctccgggg ccgggcccag 240  
gtgcggctgg aggaggtggc gcccctcttg gagtgggtgct ccagccaccc ccgggagcgg 300  
gtgaaggtgg ccatacctga ctcgccccac ctccctcaccg aggcgcgcgc caacgccctc 360  
ctcaagctcc tggaggagcc cccttcctac gcccgcatcg tcctcatcgc cccaagccgc 420  
gccaccctcc tccccaccct ggcctcccg gccacggagg tggcattcgc ccccggtgcc 480  
gaggaggccc tgcgcgccct caccaggac ccggagctcc tccgctacgc cgcgggggcc 540  
ccgggcccgc tccttagggc cctccaggac ccggaggggt accgggcccg catggccagg 600  
gcgcaaaggg tcctgaaagc cccgcccctg ggcgcctcgc ctttgcttcg ggagcttttg 660  
gccgaggagg aggggggtcca cgccctccac gccgtcctaa agcgcgccga gcacctcctt 720  
gccctggagc gggcgccgga ggccctggag gggtagctga gccccgagct ggtcctcgcc 780  
cggctggcct tagacttaga gaca 804

<210> 156

<211> 268

<212> PRT

<213> Thermus thermophilus

<400> 156

Met Ala Leu His Pro Ala His Pro Gly Ala Ile Ile Gly His Glu Ala  
1 5 10 15

Val Leu Ala Leu Leu Pro Arg Leu Thr Ala Gln Thr Leu Leu Phe Ser  
20 25 30

Gly Pro Glu Gly Val Gly Arg Arg Thr Val Ala Arg Trp Tyr Ala Trp  
35 40 45

Gly Leu Asn Arg Gly Phe Pro Pro Pro Ser Leu Gly Glu His Pro Asp  
 50 55 60  
 Val Leu Glu Val Gly Pro Lys Ala Arg Asp Leu Arg Gly Arg Ala Glu  
 65 70 75 80  
 Val Arg Leu Glu Glu Val Ala Pro Leu Leu Glu Trp Cys Ser Ser His  
 85 90 95  
 Pro Arg Glu Arg Val Lys Val Ala Ile Leu Asp Ser Ala His Leu Leu  
 100 105 110  
 Thr Glu Ala Ala Ala Asn Ala Leu Leu Lys Leu Leu Glu Glu Pro Pro  
 115 120 125  
 Ser Tyr Ala Arg Ile Val Leu Ile Ala Pro Ser Arg Ala Thr Leu Leu  
 130 135 140  
 Pro Thr Leu Ala Ser Arg Ala Thr Glu Val Ala Phe Ala Pro Val Pro  
 145 150 155 160  
 Glu Glu Ala Leu Arg Ala Leu Thr Gln Asp Pro Glu Leu Leu Arg Tyr  
 165 170 175  
 Ala Ala Gly Ala Pro Gly Arg Leu Leu Arg Ala Leu Gln Asp Pro Glu  
 180 185 190  
 Gly Tyr Arg Ala Arg Met Ala Arg Ala Gln Arg Val Leu Lys Ala Pro  
 195 200 205  
 Pro Leu Glu Arg Leu Ala Leu Leu Arg Glu Leu Leu Ala Glu Glu Glu  
 210 215 220  
 Gly Val His Ala Leu His Ala Val Leu Lys Arg Pro Glu His Leu Leu  
 225 230 235 240  
 Ala Leu Glu Arg Ala Arg Glu Ala Leu Glu Gly Tyr Val Ser Pro Glu  
 245 250 255  
 Leu Val Leu Ala Arg Leu Ala Leu Asp Leu Glu Thr  
 260 265

<210> 157

<211> 729

<212> DNA

<213> *Thermus thermophilus*



<400> 157

atgctggacc tgagggaggt gggggaggcg gagggtgaagg ccctaaagcc ccttttggaa 60  
agcgtgcccc agggcgctcc cgtcctcctc ctggacccta agccaagccc ctcccgggcg 120  
gccttctacc ggaaccggga aaggcgggac tccccacccc ccaaggggaa ggacctggtg 180  
cggcacctgg aaaaccgggc caagcgctg gggctcaggc tcccgggagg ggtggcccag 240  
tacctggcct ccctggaggg ggacctcgag gccctggagc gggagctgga gaagcttgcc 300  
ctcctctccc caccctcac cctggagaag gtggagaagg tgggtggccct gaggcccccc 360  
ctcacgggct ttgacctggt gcgctccgtc ctggagaagg accccaagga ggccctcctg 420  
cgcctaggcg gcctcaagga ggagggggag gagccctca ggctcctcgg ggccctctcc 480  
tggcagttcg ccctcctcgc ccgggccttc ttcctcctcc gggaaaaccc caggcccaag 540  
gaggaggacc tcgcccgcct cgaggcccac ccctacgccg cccgccgcgc cctggaggcg 600  
gcgaagcgcc tcacggaaga ggccctcaag gaggccctgg acgccctcat ggaggcggaa 660  
aagagggcca agggggggaa agaccggtg ctcgccctgg aggcggcggt cctccgcctc 720  
gcccggtga 729

<210> 158

<211> 292

<212> PRT

<213> *Thermus thermophilus*

<400> 158

Met Val Ile Ala Phe Thr Gly Asp Pro Phe Leu Ala Arg Glu Ala Leu  
1 5 10 15  
Leu Glu Glu Ala Arg Leu Arg Gly Leu Ser Arg Phe Thr Glu Pro Thr  
20 25 30  
Pro Glu Ala Leu Ala Gln Ala Leu Ala Pro Gly Leu Phe Gly Gly Gly  
35 40 45  
Gly Ala Met Leu Asp Leu Arg Glu Val Gly Glu Ala Glu Trp Lys Ala  
50 55 60  
Leu Lys Pro Leu Leu Glu Ser Val Pro Glu Gly Val Pro Val Leu Leu  
65 70 75 80  
Leu Asp Pro Lys Pro Ser Pro Ser Arg Ala Ala Phe Tyr Arg Asn Arg  
85 90 95  
Glu Arg Arg Asp Phe Pro Thr Pro Lys Gly Lys Asp Leu Val Arg His  
100 105 110  
Leu Glu Asn Arg Ala Lys Arg Leu Gly Leu Arg Leu Pro Gly Gly Val  
115 120 125  
Ala Gln Tyr Leu Ala Ser Leu Glu Gly Asp Leu Glu Ala Leu Glu Arg  
130 135 140

Glu Leu Glu Lys Leu Ala Leu Leu Ser Pro Pro Leu Thr Leu Glu Lys  
 145 150 155 160  
 Val Glu Lys Val Val Ala Leu Arg Pro Pro Leu Thr Gly Phe Asp Leu  
 165 170 175  
 Val Arg Ser Val Leu Glu Lys Asp Pro Lys Glu Ala Leu Leu Arg Leu  
 180 185 190  
 Gly Gly Leu Lys Glu Glu Gly Glu Glu Pro Leu Arg Leu Leu Gly Ala  
 195 200 205  
 Leu Ser Trp Gln Phe Ala Leu Leu Ala Arg Ala Phe Phe Leu Leu Arg  
 210 215 220  
 Glu Asn Pro Arg Pro Lys Glu Glu Asp Leu Ala Arg Leu Glu Ala His  
 225 230 235 240  
 Pro Tyr Ala Ala Arg Arg Ala Leu Glu Ala Ala Lys Arg Leu Thr Glu  
 245 250 255  
 Glu Ala Leu Lys Glu Ala Leu Asp Ala Leu Met Glu Ala Glu Lys Arg  
 260 265 270  
 Ala Lys Gly Gly Lys Asp Pro Trp Leu Ala Leu Glu Ala Ala Val Leu  
 275 280 285  
 Arg Leu Ala Arg  
 290

<210> 159

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 159

gtgtgtcata tgagtaagga tttcgtccac cttcacc

37

<210> 160

<211> 34

<212> DNA

<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 160  
gtgtgtggat ccggggacta ctcggaagta aggg 34

<210> 161  
<211> 36  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 161  
gtgtgtcata tggaaaccac aatattccag ttccag 36

<210> 162  
<211> 39  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 162  
gtgtgtggat ctttatccac catgagaagt atttttcac 39

<210> 163  
<211> 41  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 163  
gtgtgtcata tggaaaaagt tttttttgga aaaaactcca g 41

<210> 164  
<211> 35  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 164  
gtgtgtggat ccttaatccg cctgaacggc taacg 35

<210> 165  
<211> 41  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 165  
gtgtgtcata tgaactacgt tcccttcgcg agaaagtaca g 41

<210> 166  
<211> 36  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 166  
gtgtgtggat ccttaaaaca gcctcgcccc gctgga 36

<210> 167  
<211> 33  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 167  
gtgtgtcata tgcgcgttaa ggtggacagg gag 33

<210> 168  
<211> 35  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 168  
tgtgtctcga gtcattggcta caccctcatc ggcat 35

<210> 169  
<211> 47  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 169  
gtgtgtcata tgctcaataa gggtttttata ataggaagac ttacggg 47

<210> 170  
<211> 39  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: primer

<400> 170  
gtgtggatcc ttaaaaaggt atttcgtcct cttcatcgg 39

<210> 171  
<211> 807  
<212> DNA  
<213> *Thermus thermophilus*

<400> 171  
atggctcgag gcctgaaccg cgtttttctc atcggcgccc tcgccaccg gccggacatg 60  
cgctacaccc cggcggggct cgccattttg gacctgaccc tcgccggtca ggacctgctt 120  
ctttccgata acggggggga accggagggtg tcctgggtacc accgggtgag gctcttaggc 180  
cgccaggcgg agatgtgggg cgacctcttg gaccaagggc agtcgtctt cgtggaggggc 240  
cgcttgagat accgccagt ggaaggaggag ggggagaagc ggagcgagct ccagatccgg 300  
gccgacttcc ggacccccctg gacgaccggg ggaagaagcg ggcgaggagc agccggggcc 360  
agcccaggct ccgcgcgcc ctgaaccagg tcttcctcat gggcaacctg acccgggacc 420  
cggaactccg ctacaccccc cagggcaccg cgggtggccc gctgggctg gcggtgaacg 480  
agcgcgcca gggggcgag gagcgacccc acttcgtgga gggtcaggcc tggcgcgacc 540  
tggcggagtg ggccgccgag ctgaggaagg gcgacggcct ttcgtgatc ggcaggttgg 600

tgaacgactc ctggaccagc tccagcggcg agcggcgctt ccagaccggt gtggaggccc 660  
 tcaggctgga gcgccccacc cgtggacctg cccaggcctg cccaggccgg cggaacaggt 720  
 cccgcgaagt ccagacgggt ggggtggaca ttgacgaagg cttggaagac tttccgccgg 780  
 aggaggattt gccgttttga gcacgaa 807

<210> 172

<211> 266

<212> PRT

<213> *Thermus thermophilus*

<400> 172

Met Ala Arg Gly Leu Asn Arg Val Phe Leu Ile Gly Ala Leu Ala Thr  
 1 5 10 15

Arg Pro Asp Met Arg Tyr Thr Pro Ala Gly Leu Ala Ile Leu Asp Leu  
 20 25 30

Thr Leu Ala Gly Gln Asp Leu Leu Leu Ser Asp Asn Gly Gly Glu Pro  
 35 40 45

Glu Val Ser Trp Tyr His Arg Val Arg Leu Leu Gly Arg Gln Ala Glu  
 50 55 60

Met Trp Gly Asp Leu Leu Asp Gln Gly Gln Leu Val Phe Val Glu Gly  
 65 70 75 80

Arg Leu Glu Tyr Arg Gln Trp Glu Arg Glu Gly Glu Lys Arg Ser Glu  
 85 90 95

Leu Gln Ile Arg Ala Asp Phe Leu Asp Pro Leu Asp Asp Arg Gly Lys  
 100 105 110

Lys Arg Ala Glu Asp Ser Arg Gly Gln Pro Arg Leu Arg Ala Ala Leu  
 115 120 125

Asn Gln Val Phe Leu Met Gly Asn Leu Thr Arg Asp Pro Glu Leu Arg  
 130 135 140

Tyr Thr Pro Gln Gly Thr Ala Val Ala Arg Leu Gly Leu Ala Val Asn  
 145 150 155 160

Glu Arg Arg Gln Gly Ala Glu Glu Arg Thr His Phe Val Glu Val Gln  
 165 170 175

Ala Trp Arg Asp Leu Ala Glu Trp Ala Ala Glu Leu Arg Lys Gly Asp  
 180 185 190

Gly Leu Phe Val Ile Gly Arg Leu Val Asn Asp Ser Trp Thr Ser Ser  
 195 200 205

Ser Gly Glu Arg Arg Phe Gln Thr Arg Val Glu Ala Leu Arg Leu Glu  
 210 215 220

Arg Pro Thr Arg Gly Pro Ala Gln Ala Cys Pro Gly Arg Arg Asn Arg  
 225 230 235 240

Ser Arg Glu Val Gln Thr Gly Gly Val Asp Ile Asp Glu Gly Leu Glu  
 245 250 255

Asp Phe Pro Pro Glu Glu Asp Leu Pro Phe  
 260 265

<210> 173

<211> 992

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 173

aattccgaca tttcaattga atcgtttatt ccgcttgaaa aagaaggcaa gttgctcggt 60  
 gatgtgaaaa gaccggggag catcgtagtg caggcgcgct ttttctctga aatcgtgaaa 120  
 aaactgccgc aacaaacggt ggaaatcgaa acggaagaca actttttgac gatcatccgc 180  
 tcggggcact cagaattccg cctcaatggg ctaaaccgac acgaatatcc gcgcctgccg 240  
 caaattgaag aagaaaacgt gtttcaaata ccggctgatt tattgaaaac cgtgattcgg 300  
 caaacggtgt tcgccgtttc tacatcgga acgcgcccaa tcttgacagg tgtcaactgg 360  
 aaagtgaac atggcgagct tgtctgcaca gcgaccgaca gtcacgctt agccatgcgc 420  
 aaagtgaana ttgagtcgga aaatgaagta tcatacaacg tcgtcatccc tggaaaaagt 480  
 cttaatgagc tcagcaaaat tttggatgac ggcaaccacc cggaggacat cgtcatgaca 540  
 gccaatcaag tgctatttaa ggccgagcac cttctcttct tttcccggt gcttgacggc 600  
 aactatccgg agacggcccc cttgattcca acagaaagca aaacgaccat gatcgtcaat 660  
 gcaaaagagt ttctgcaggc aatcgaccga gcgtccttgc ttgctcgaga aggaaggaa 720  
 aacgttgtga aactgacgac gcttccttga ggaatgctcg aaatttcttc gatttctccg 780  
 agatcgggaa agtgacggag cagctgcaaa cggagtctct tgaaggggaa gagttgaaca 840  
 tttcgttcag cgcgaaatat atgatggacg cgttgccggc gcttgatgga acagacattt 900  
 caaatcagct tcaactggggc catgcggccg ttctgtgtgc gcccgcttca accgattcga 960  
 tgcttcagct cattttgccg gtgagaacat at 992

<210> 174

<211> 334

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 174

Asn Ser Asp Ile Ser Ile Ile Glu Ser Phe Ile Pro Leu Glu Lys Glu

1	5	10	15
Gly Lys Leu Leu Val Asp Val Lys Arg Pro Gly Ser Ile Val Leu Gln	20	25	30
Ala Arg Phe Phe Ser Glu Ile Val Lys Lys Leu Pro Gln Gln Thr Val	35	40	45
Glu Ile Glu Thr Glu Asp Asn Phe Leu Thr Ile Ile Arg Ser Gly His	50	55	60
Ser Glu Phe Arg Leu Asn Gly Leu Asn Ala Asp Glu Tyr Pro Arg Leu	65	70	75
Pro Gln Ile Glu Glu Glu Asn Val Phe Gln Ile Pro Ala Asp Leu Leu	85	90	95
Lys Thr Val Ile Arg Gln Thr Val Phe Ala Val Ser Thr Ser Glu Thr	100	105	110
Arg Pro Ile Leu Thr Gly Val Asn Trp Lys Val Glu His Gly Glu Leu	115	120	125
Val Cys Thr Ala Thr Asp Ser His Arg Leu Ala Met Arg Lys Val Lys	130	135	140
Ile Ile Glu Ser Glu Asn Glu Val Ser Tyr Asn Val Val Ile Pro Gly	145	150	155
Lys Ser Leu Asn Glu Leu Ser Lys Ile Ile Leu Asp Asp Gly Asn His	165	170	175
Pro Val Asp Ile Val Met Thr Ala Asn Gln Val Leu Phe Lys Ala Glu	180	185	190
His Leu Leu Phe Phe Ser Arg Leu Leu Asp Gly Asn Tyr Pro Glu Thr	195	200	205
Ala Arg Leu Ile Pro Thr Glu Ser Lys Thr Thr Met Ile Val Asn Ala	210	215	220
Lys Glu Phe Leu Gln Ala Ile Asp Arg Ala Ser Leu Leu Ala Arg Glu	225	230	235
Gly Arg Asn Asn Val Val Lys Leu Thr Thr Leu Pro Gly Gly Met Leu	245	250	255
Glu Ile Ser Ser Ile Ser Pro Glu Ile Gly Lys Val Thr Glu Gln Leu			



260 265 270

Gln Thr Glu Ser Leu Glu Gly Glu Glu Leu Asn Ile Ser Phe Ser Ala  
 275 280 285

Lys Tyr Met Met Asp Ala Leu Arg Ala Leu Asp Gly Thr Asp Ile Gln  
 290 295 300

Ile Ser Phe Thr Gly Ala Met Arg Pro Phe Leu Leu Arg Pro Leu His  
 305 310 315 320

Thr Asp Ser Met Leu Gln Leu Ile Leu Pro Val Arg Thr Tyr  
 325 330

<210> 175

<211> 492

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 175

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 cagggcgagc gggaaacgga ttttattcaa tgtgtcgttt ggccgcccca ggcggaaaac 180  
 gtcgccaact ttttgaaaaa ggggagcttg gctggtgtcg atggccgact gcaaaccgcg 240  
 agctatgaaa atcaagaagg tcggcggtgtg tacgtgacgg aagtgggtggc tgatagcgtc 300  
 caatttcttg agccgaaagg aacgagcgag cagcgagggg cgacagcagg cggctactat 360  
 ggggatccat tcccatcgg gcaagatcag aaccaccaat atccgaacga aaaagggttt 420  
 ggccgcatcg atgacgatcc tttcgccaat gacggccagc cgatcgatat ttctgatgat 480  
 gatttgccgt tt 492

<210> 176

<211> 164

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 176

Met Ile Asn Arg Val Ile Leu Val Gly Arg Leu Thr Arg Asp Pro Glu  
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Leu Arg Tyr Thr Pro Ser Gly Val Ala Val Ala Thr Phe Thr Leu Ala  
 20 25 30

Val Asn Arg Pro Phe Thr Asn Gln Ser Tyr Glu Asn Gln Glu Gly Arg  
 35 40 45

Arg Val Tyr Val Thr Glu Val Val Ala Asp Ser Val Gln Phe Leu Glu

50

55

60

Pro Lys Gly Thr Ser Glu Gln Arg Gly Ala Thr Ala Gly Gly Tyr Tyr  
65 70 75 80

Gln Gly Glu Arg Glu Thr Asp Phe Ile Gln Cys Val Val Trp Arg Arg  
85 90 95

Gln Ala Glu Asn Val Ala Asn Phe Leu Lys Lys Gly Ser Leu Ala Gly  
100 105 110

Val Asp Gly Arg Leu Gln Thr Arg Gly Asp Pro Phe Pro Phe Gly Gln  
115 120 125

Asp Gln Asn His Gln Tyr Pro Asn Glu Lys Gly Phe Gly Arg Ile Asp  
130 135 140

Asp Asp Pro Phe Ala Asn Asp Gly Gln Pro Ile Asp Ile Ser Asp Asp  
145 150 155 160

Asp Leu Pro Phe

<210> 177

<211> 1044

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 177

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ggccccgagg agcgggagtg gaacttggct gtgtacgact gcgaggaaac gccgatcgag 180  
gcggcgcttg aggaggccga gacggtgccg tttttcggcg agcggcggtg cattctcatc 240  
aagcatccat atttttttac gtctgaaaaa gagaaggaga tcgaacatga tttggcgaag 300  
ctggaggcgt acttgaaggc gccgtcgccg ttttcgatcg tcgtcttttt cgcgccgtac 360  
gagaagcttg atgagcgaaa aaaaattacg aagctcgcca aagagcaaag cgaagtcgtc 420  
atcgccgccc cgctcgccga agcggagctg cgtgcctggg tcggcgccg catcgagagc 480  
caagggggcgc aagcaagcga cgaggcgatt gatgtcctgt tcggcggggc cgggacgcag 540  
ctttccgcct tggcgaatga aatcgataaa ttggccctgt ttgccggatc gggcggaacc 600  
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caagcggggc gccacggccg gcgg 1044

<210> 178

<211> 348

<212> PRT

<213> Bacillus stearothermophilus

<400> 178

Met Leu Glu Arg Val Trp Gly Asn Ile Glu Lys Arg Arg Phe Ser Pro  
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Leu Tyr Leu Leu Tyr Gly Asn Glu Pro Phe Leu Leu Thr Glu Thr Tyr  
20 25 30

Glu Arg Leu Val Asn Ala Ala Leu Gly Pro Glu Glu Arg Glu Trp Asn  
35 40 45

Leu Ala Val Tyr Asp Cys Glu Glu Thr Pro Ile Glu Ala Ala Leu Glu  
50 55 60

Glu Ala Glu Thr Val Pro Phe Phe Gly Glu Arg Arg Val Ile Leu Ile  
65 70 75 80

Lys His Pro Tyr Phe Phe Thr Ser Glu Lys Glu Lys Glu Ile Glu His  
85 90 95

Asp Leu Ala Lys Leu Glu Ala Tyr Leu Lys Ala Pro Ser Pro Phe Ser  
100 105 110

Ile Val Val Phe Phe Ala Pro Tyr Glu Lys Leu Asp Glu Arg Lys Lys  
115 120 125

Ile Thr Lys Leu Ala Lys Glu Gln Ser Glu Val Val Ile Ala Ala Pro  
130 135 140

Leu Ala Glu Ala Glu Leu Arg Ala Trp Val Arg Arg Arg Ile Glu Ser  
145 150 155 160

Gln Gly Ala Gln Ala Ser Asp Glu Ala Ile Asp Val Leu Leu Arg Arg  
165 170 175

Ala Gly Thr Gln Leu Ser Ala Leu Ala Asn Glu Ile Asp Lys Leu Ala  
180 185 190

Leu Phe Ala Gly Ser Gly Gly Thr Ile Glu Ala Ala Ala Val Glu Arg  
195 200 205

Leu Val Ala Arg Thr Pro Glu Glu Asn Val Phe Val Leu Val Glu Gln

210	215	220
Val Ala Lys Arg Asp Ile Pro Ala Ala Leu Gln Thr Phe Tyr Asp Leu		
225	230	235 240
Leu Glu Asn Asn Glu Glu Pro Ile Lys Ile Leu Ala Leu Leu Ala Ala		
	245	250 255
His Phe Arg Leu Leu Ser Gln Val Lys Trp Leu Ala Ser Leu Gly Tyr		
	260	265 270
Gly Gln Ala Gln Ile Ala Ala Ala Leu Lys Val His Pro Phe Arg Val		
	275	280 285
Lys Leu Ala Leu Ala Gln Ala Ala Arg Phe Ala Asp Gly Glu Leu Ala		
	290	295 300
Glu Ala Ile Asn Glu Leu Ala Asp Ala Asp Tyr Glu Val Lys Ser Gly		
305	310	315 320
Ala Val Asp Arg Arg Leu Ala Val Glu Leu Leu Leu Met Arg Trp Gly		
	325	330 335
Ala Arg Pro Ala Gln Ala Gly Arg His Gly Arg Arg		
	340	345

<210> 179

<211> 757

<212> DNA

<213> Bacillus stearothermophilus

<400> 179

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ccgtgtctag	agtgccgcaa	ctgccggcgc	atcgactccg	gcaaccaccc	tgacgtccgg	240
gtgatcggcc	cagatggagg	atcaatcaaa	aaggaacaaa	tcgaatggct	gcagcaagag	300
ttctcgaaaa	cagcgggtcg	gtcggataaa	aaaatgtaca	tcgttgagca	cgccgatcaa	360
atgacgacaa	gcgctgccaa	cagccttctg	aaatTTTTTg	aagagccgca	tccggggacg	420
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caagtgcctt	cgttccggcc	gttgccgcgc	gcagagctcg	cccagggact	tgctcaggag	540
cacgtgccgt	tgccgttggc	gctgttggtg	gcccatttga	caaacagctt	cgaggaagca	600
ctggcgcttg	ccaaagatag	ttggtttgcc	gaggcgcgaa	cattagtgtg	acaatggtat	660
gagatgctgg	gcaagccgga	gctgcagctt	ttgtttttca	tccacgaccg	cttgttttccg	720
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<210> 180

<211> 252

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 180

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Leu Gln Ser Gly Leu Glu Lys Gly Arg Ile Ser His Ala Tyr Leu Phe  
20 25 30

Glu Gly Gln Arg Gly Thr Gly Lys Lys Ala Ala Ser Leu Leu Leu Ala  
35 40 45

Lys Arg Leu Phe Cys Leu Ser Pro Ile Gly Val Ser Pro Cys Leu Glu  
50 55 60

Cys Arg Asn Cys Arg Arg Ile Asp Ser Gly Asn His Pro Asp Val Arg  
65 70 75 80

Val Ile Gly Pro Asp Gly Gly Ser Ile Lys Lys Glu Gln Ile Glu Trp  
85 90 95

Leu Gln Gln Glu Phe Ser Lys Thr Ala Val Glu Ser Asp Lys Lys Met  
100 105 110

Tyr Ile Val Glu His Ala Asp Gln Met Thr Thr Ser Ala Ala Asn Ser  
115 120 125

Leu Leu Lys Phe Leu Glu Glu Pro His Pro Gly Thr Val Ala Val Leu  
130 135 140

Leu Thr Glu Gln Tyr His Arg Leu Leu Gly Thr Ile Val Ser Arg Cys  
145 150 155 160

Gln Val Leu Ser Phe Arg Pro Leu Pro Pro Ala Glu Leu Ala Gln Gly  
165 170 175

Leu Val Glu Glu His Val Pro Leu Pro Leu Ala Leu Leu Ala Ala His  
180 185 190

Leu Thr Asn Ser Phe Glu Glu Ala Leu Ala Leu Ala Lys Asp Ser Trp  
195 200 205

Phe Ala Glu Ala Arg Thr Leu Val Leu Gln Trp Tyr Glu Met Leu Gly  
210 215 220

Lys Pro Glu Leu Gln Leu Leu Phe Phe Ile His Asp Arg Leu Phe Pro  
 225 230 235 240

His Phe Leu Glu Ser His Gln Leu Asp Leu Gly Leu  
 245 250

<210> 181

<211> 1677

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 181

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<210> 182

<211> 559

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 182

Val Ala Tyr Gln Ala Leu Tyr Arg Val Phe Arg Pro Gln Arg Phe Ala  
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Asp Met Val Gly Gln Glu His Val Thr Lys Thr Leu Gln Ser Ala Leu  
20 25 30

Leu Gln His Lys Ile Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly  
35 40 45

Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys  
50 55 60

Glu Gln Ala Pro Ala Ala Glu Pro Cys Asn Glu Cys Pro Ala Cys Leu  
65 70 75 80

Gly Ile Thr Asn Gly Thr Val Pro Asp Val Leu Glu Ile Asp Ala Ala  
85 90 95

Ser Asn Asn Arg Val Asp Glu Ile Arg Asp Ile Arg Glu Lys Val Lys  
100 105 110

Phe Ala Pro Thr Ser Ala Arg Tyr Lys Val Tyr Ile Ile Asp Glu Val  
115 120 125

His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu  
130 135 140

Glu Pro Pro Lys His Val Ile Phe Ile Leu Ala Thr Thr Glu Pro His  
145 150 155 160

Lys Ile Pro Ala Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Arg  
165 170 175

Arg Ile Pro Leu Gln Ala Ile Val Ser Arg Leu Lys Tyr Val Ala Ser  
180 185 190

Ala Gln Gly Val Glu Ala Ser Asp Glu Ala Leu Ser Ala Ile Ala Arg  
195 200 205

Ala Ala Asp Gly Gly Met Arg Asp Ala Leu Ser Leu Leu Asp Gln Ala  
210 215 220

Ile Ser Phe Ser Asp Gly Lys Leu Arg Leu Asp Asp Val Leu Ala Met  
225 230 235 240

Thr Gly Ala Ala Ser Phe Ala Ala Leu Ser Ser Phe Ile Glu Ala Ile  
245 250 255

His Arg Lys Asp Thr Ala Ala Val Leu Gln His Leu Glu Thr Met Met  
 260 265 270  
 Ala Gln Gly Lys Asp Pro His Arg Leu Val Glu Asp Leu Ile Leu Tyr  
 275 280 285  
 Tyr Arg Asp Leu Leu Leu Tyr Lys Thr Ala Pro Tyr Val Glu Gly Ala  
 290 295 300  
 Ile Gln Ile Ala Val Val Asp Glu Ala Phe Thr Ser Leu Ser Glu Met  
 305 310 315 320  
 Ile Pro Val Ser Asn Leu Tyr Glu Ala Ile Glu Leu Leu Asn Lys Ser  
 325 330 335  
 Gln Gln Glu Met Lys Trp Thr Asn His Pro Arg Leu Leu Leu Glu Val  
 340 345 350  
 Ala Leu Val Lys Leu Cys His Pro Ser Ala Ala Ala Pro Ser Leu Ser  
 355 360 365  
 Ala Ser Glu Leu Glu Pro Leu Ile Lys Arg Ile Glu Thr Leu Glu Ala  
 370 375 380  
 Glu Leu Arg Arg Leu Lys Glu Gln Pro Pro Ala Pro Pro Ser Thr Ala  
 385 390 395 400  
 Ala Pro Val Lys Lys Leu Ser Lys Pro Met Lys Thr Gly Gly Tyr Lys  
 405 410 415  
 Ala Pro Val Gly Arg Ile Tyr Glu Leu Leu Lys Gln Ala Thr His Glu  
 420 425 430  
 Asp Leu Ala Leu Val Lys Gly Cys Trp Ala Asp Val Leu Asp Thr Leu  
 435 440 445  
 Lys Arg Gln His Lys Val Ser His Ala Ala Leu Leu Gln Glu Ser Glu  
 450 455 460  
 Pro Val Ala Ala Ser Ala Ser Ala Phe Val Leu Lys Phe Lys Tyr Glu  
 465 470 475 480  
 Ile His Cys Lys Met Ala Thr Asp Pro Thr Ser Ser Val Lys Glu Asn  
 485 490 495  
 Val Glu Ala Ile Leu Phe Glu Leu Thr Asn Arg Arg Phe Glu Met Val  
 500 505 510



Ala Ile Pro Glu Gly Glu Trp Gly Lys Ile Arg Glu Glu Phe Ile Arg  
515 520 525

Asn Lys Asp Ala Met Val Glu Lys Ser Glu Glu Asp Pro Leu Ile Ala  
530 535 540

Glu Ala Lys Arg Leu Phe Gly Glu Glu Leu Ile Glu Ile Lys Glu  
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<210> 183

<211> 4301

<212> DNA

<213> Bacillus stearothermophilus

<400> 183

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ttgacgccat gatcaaagga tcaccgccca ttcgcaagcg gattgaggaa atcaacgcca 3960
aaggcattca ggcgacggcg aaagaaaaaa gcttgctcac ggttccttag gtggccttag 4020
agatgtgcga gcgcggcttt tcctttaaaa atatcgattt gtaccgctcg caggcgacgg 4080
aattcgatcat tgacggcaat tctctcatcc cgccgttcaa cgccattccg gggcttgggg 4140
cgaacgtggc gcaggcgatc gtgcgcgccc gcgaggaagg cgagtttttg tcgaaggagg 4200
atgtgcaaca gcgcggcaaa ttgtcgaaaa cgctgctcga gtatctagaa agccgcggct 4260
gccttgactc gcttcagac cataaccagc tgctcgctgtt t 4301

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<210> 184

<211> 1433

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 184

Met Val Thr Lys Glu Gln Lys Glu Arg Phe Leu Ile Leu Leu Glu Gln  
1 5 10 15

Leu Lys Met Thr Ser Asp Glu Trp Met Pro His Phe Arg Glu Ala Ala  
20 25 30

Ile Arg Lys Val Val Ile Asp Lys Glu Glu Lys Ser Trp His Phe Tyr  
35 40 45

Phe Gln Phe Asp Asn Val Leu Pro Val His Val Tyr Lys Thr Phe Ala  
50 55 60

Asp Arg Leu Gln Thr Ala Phe Arg His Ile Ala Ala Val Arg His Thr  
65 70 75 80

Met Glu Val Glu Ala Pro Arg Val Thr Glu Ala Asp Val Gln Ala Tyr  
85 90 95

Trp Pro Leu Cys Leu Ala Glu Leu Gln Glu Gly Met Ser Pro Leu Val  
100 105 110

Asp Trp Leu Ser Arg Gln Thr Pro Glu Leu Lys Gly Asn Lys Leu Leu  
115 120 125

Val Val Ala Arg His Glu Ala Glu Ala Leu Ala Ile Lys Arg Arg Phe  
130 135 140

Ala Lys Lys Ile Ala Asp Val Tyr Ala Ser Phe Gly Phe Pro Pro Leu  
145 150 155 160

Gln Leu Asp Val Ser Val Glu Pro Ser Lys Gln Glu Met Glu Gln Phe  
165 170 175

Leu Ala Gln Lys Gln Gln Glu Asp Glu Glu Arg Ala Leu Ala Val Leu  
180 185 190

Thr Asp Leu Ala Arg Glu Glu Glu Lys Ala Ala Ser Ala Pro Pro Ser  
195 200 205

Gly Pro Leu Val Ile Gly Tyr Pro Ile Arg Asp Glu Glu Pro Val Arg  
210 215 220

Arg Leu Glu Thr Ile Val Glu Glu Glu Arg Arg Val Val Val Gln Gly  
225 230 235 240

Tyr Val Phe Asp Ala Glu Val Ser Glu Leu Lys Ser Gly Arg Thr Leu  
245 250 255

Leu Thr Met Lys Ile Thr Asp Tyr Thr Asn Ser Ile Leu Val Lys Met  
 260 265 270  
 Phe Ser Arg Asp Lys Glu Asp Ala Glu Leu Met Ser Gly Val Lys Lys  
 275 280 285  
 Gly Met Trp Val Lys Val Arg Gly Ser Val Gln Asn Asp Thr Phe Val  
 290 295 300  
 Arg Asp Leu Val Ile Ile Ala Asn Asp Leu Asn Glu Ile Ala Ala Asn  
 305 310 315 320  
 Glu Arg Gln Asp Thr Ala Pro Glu Gly Glu Lys Arg Val Glu Leu His  
 325 330 335  
 Leu His Thr Pro Met Ser Gln Met Asp Ala Val Thr Ser Val Thr Lys  
 340 345 350  
 Leu Ile Glu Gln Ala Lys Lys Trp Gly His Pro Ala Ile Ala Val Thr  
 355 360 365  
 Asp His Ala Val Val Gln Ser Phe Pro Glu Ala Tyr Ser Ala Ala Lys  
 370 375 380  
 Lys His Gly Met Lys Val Ile Tyr Gly Leu Glu Ala Asn Ile Val Asp  
 385 390 395 400  
 Asp Gly Val Pro Ile Ala Tyr Asn Glu Thr His Arg Arg Leu Ser Glu  
 405 410 415  
 Glu Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val  
 420 425 430  
 Tyr Asn Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Asp Gly Glu  
 435 440 445  
 Ile Ile Asp Arg Phe Met Ser Phe Ala Asn Pro Gly His Pro Leu Ser  
 450 455 460  
 Val Thr Thr Met Glu Leu Thr Gly Ile Thr Asp Glu Met Val Lys Asp  
 465 470 475 480  
 Ala Pro Lys Pro Asp Glu Val Leu Ala Arg Phe Val Asp Trp Ala Gly  
 485 490 495  
 Asp Ala Thr Leu Val Ala His Asn Ala Ser Phe Asp Ile Gly Phe Leu  
 500 505 510

Asn	Ala	Gly	Leu	Ala	Arg	Met	Gly	Arg	Gly	Lys	Ile	Ala	Asn	Pro	Val	515	520	525
Ile	Asp	Thr	Leu	Glu	Leu	Ala	Arg	Phe	Leu	Tyr	Pro	Asp	Leu	Lys	Asn	530	535	540
His	Arg	Leu	Asn	Thr	Leu	Cys	Lys	Lys	Phe	Asp	Ile	Glu	Leu	Thr	Gln	545	550	555
His	His	Arg	Ala	Ile	Tyr	Asp	Ala	Glu	Ala	Thr	Gly	His	Leu	Leu	Met	565	570	575
Arg	Leu	Leu	Lys	Glu	Ala	Glu	Glu	Arg	Gly	Ile	Leu	Phe	His	Asp	Glu	580	585	590
Leu	Asn	Ser	Arg	Thr	His	Ser	Glu	Ala	Ser	Tyr	Arg	Leu	Ala	Arg	Pro	595	600	605
Phe	His	Val	Thr	Leu	Leu	Ala	Gln	Asn	Glu	Thr	Gly	Leu	Lys	Asn	Leu	610	615	620
Phe	Lys	Leu	Val	Ser	Leu	Ser	His	Ile	Gln	Tyr	Phe	His	Arg	Val	Pro	625	630	635
Arg	Ile	Pro	Arg	Ser	Val	Leu	Val	Lys	His	Arg	Asp	Gly	Leu	Leu	Val	645	650	655
Gly	Ser	Gly	Cys	Asp	Lys	Gly	Glu	Leu	Phe	Asp	Asn	Leu	Ile	Gln	Lys	660	665	670
Ala	Pro	Glu	Glu	Val	Glu	Asp	Ile	Ala	Arg	Phe	Tyr	Asp	Phe	Leu	Glu	675	680	685
Val	His	Pro	Pro	Asp	Val	Tyr	Lys	Pro	Leu	Ile	Glu	Met	Asp	Tyr	Val	690	695	700
Lys	Asp	Glu	Glu	Met	Ile	Lys	Asn	Ile	Ile	Arg	Ser	Ile	Val	Ala	Leu	705	710	715
Gly	Glu	Lys	Leu	Asp	Ile	Pro	Val	Val	Ala	Thr	Gly	Asn	Val	His	Tyr	725	730	735
Leu	Asn	Pro	Glu	Asp	Lys	Ile	Tyr	Arg	Lys	Ile	Leu	Ile	His	Ser	Gln	740	745	750
Gly	Gly	Ala	Asn	Pro	Leu	Asn	Arg	His	Glu	Leu	Pro	Asp	Val	Tyr	Phe	755	760	765

Arg	Thr	Asn	Glu	Met	Leu	Asp	Cys	Phe	Ser	Phe	Leu	Gly	Pro	Glu	
770						775				780					
Lys	Ala	Lys	Glu	Ile	Val	Val	Asp	Asn	Thr	Gln	Lys	Ile	Ala	Ser	Leu
785					790					795					800
Ile	Gly	Asp	Val	Lys	Pro	Ile	Lys	Asp	Glu	Leu	Tyr	Thr	Pro	Arg	Ile
				805					810					815	
Glu	Gly	Ala	Asp	Glu	Glu	Ile	Arg	Glu	Met	Ser	Tyr	Arg	Arg	Ala	Lys
			820					825					830		
Glu	Ile	Tyr	Gly	Asp	Pro	Leu	Pro	Lys	Leu	Val	Glu	Glu	Arg	Leu	Glu
		835					840					845			
Lys	Glu	Leu	Lys	Ser	Ile	Ile	Gly	His	Gly	Phe	Ala	Val	Ile	Tyr	Leu
	850					855					860				
Ile	Ser	His	Lys	Leu	Val	Lys	Lys	Ser	Leu	Asp	Asp	Gly	Tyr	Leu	Val
865					870					875					880
Gly	Ser	Arg	Gly	Ser	Val	Gly	Ser	Ser	Phe	Val	Ala	Thr	Met	Thr	Glu
				885					890					895	
Ile	Thr	Glu	Val	Asn	Pro	Leu	Pro	Pro	His	Tyr	Val	Cys	Pro	Asn	Cys
			900					905					910		
Lys	His	Ser	Glu	Phe	Phe	Asn	Asp	Gly	Ser	Val	Gly	Ser	Gly	Phe	Asp
		915					920					925			
Leu	Pro	Asp	Lys	Asn	Cys	Pro	Arg	Cys	Gly	Thr	Lys	Tyr	Lys	Lys	Asp
	930					935					940				
Gly	His	Asp	Ile	Pro	Phe	Glu	Thr	Phe	Leu	Gly	Phe	Lys	Gly	Asp	Lys
945					950					955					960
Val	Pro	Asp	Ile	Asp	Leu	Asn	Phe	Ser	Gly	Glu	Tyr	Gln	Pro	Arg	Ala
				965					970					975	
His	Asn	Tyr	Thr	Lys	Val	Leu	Phe	Gly	Glu	Asp	Asn	Val	Tyr	Arg	Ala
			980					985					990		
Gly	Thr	Ile	Gly	Thr	Val	Ala	Asp	Lys	Thr	Ala	Tyr	Gly	Phe	Val	Lys
		995					1000					1005			
Ala	Tyr	Ala	Ser	Asp	His	Asn	Leu	Glu	Leu	Arg	Gly	Ala	Glu	Ile	Asp
1010						1015					1020				

Leu Ala Ala Gly Cys Thr Gly Val Lys Arg Thr Thr Gly Gln His Pro  
 1025 1030 1035 1040  
 Gly Gly Ile Ile Val Val Pro Asp Tyr Met Glu Ile Tyr Asp Phe Thr  
 1045 1050 1055  
 Pro Ile Gln Tyr Pro Ala Asp Asp Thr Ser Ser Glu Trp Arg Thr Thr  
 1060 1065 1070  
 His Phe Asp Phe His Ser Ile His Asp Asn Leu Leu Lys Leu Asp Ile  
 1075 1080 1085  
 Leu Gly His Asp Asp Pro Thr Val Ile Arg Met Leu Gln Asp Leu Ser  
 1090 1095 1100  
 Gly Ile Asp Pro Lys Thr Ile Pro Thr Asp Asp Pro Asp Val Met Gly  
 1105 1110 1115 1120  
 Ile Phe Ser Ser Thr Glu Pro Leu Gly Val Thr Pro Glu Gln Ile Met  
 1125 1130 1135  
 Cys Asn Val Gly Thr Ile Gly Ile Pro Glu Phe Gly Thr Arg Phe Val  
 1140 1145 1150  
 Arg Gln Met Leu Glu Glu Thr Arg Pro Lys Thr Phe Ser Glu Leu Val  
 1155 1160 1165  
 Gln Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp Leu Gly Asn Ala  
 1170 1175 1180  
 Gln Glu Leu Ile Gln Asn Gly Thr Cys Thr Leu Ser Glu Val Ile Gly  
 1185 1190 1195 1200  
 Cys Arg Asp Asp Ile Met Val Tyr Leu Ile Tyr Arg Gly Leu Glu Pro  
 1205 1210 1215  
 Ser Leu Ala Phe Lys Ile Met Glu Ser Val Arg Lys Gly Lys Gly Leu  
 1220 1225 1230  
 Thr Pro Glu Phe Glu Ala Glu Met Arg Lys His Asp Val Pro Glu Trp  
 1235 1240 1245  
 Tyr Ile Asp Ser Cys Lys Lys Ile Lys Tyr Met Phe Pro Lys Ala His  
 1250 1255 1260  
 Ala Ala Ala Tyr Val Leu Met Ala Val Arg Ile Ala Tyr Phe Lys Val  
 1265 1270 1275 1280

His His Pro Leu Leu Tyr Tyr Ala Ser Tyr Phe Thr Val Arg Ala Glu  
1285 1290 1295

Asp Phe Asp Leu Asp Ala Met Ile Lys Gly Ser Pro Ala Ile Arg Lys  
1300 1305 1310

Arg Ile Glu Glu Ile Asn Ala Lys Gly Ile Gln Ala Thr Ala Lys Glu  
1315 1320 1325

Lys Ser Leu Leu Thr Val Leu Glu Val Ala Leu Glu Met Cys Glu Arg  
1330 1335 1340

Gly Phe Ser Phe Lys Asn Ile Asp Leu Tyr Arg Ser Gln Ala Thr Glu  
1345 1350 1355 1360

Phe Val Ile Asp Gly Asn Ser Leu Ile Pro Pro Phe Asn Ala Ile Pro  
1365 1370 1375

Gly Leu Gly Thr Asn Val Ala Gln Ala Ile Val Arg Ala Arg Glu Glu  
1380 1385 1390

Gly Glu Phe Leu Ser Lys Glu Asp Leu Gln Gln Arg Gly Lys Leu Ser  
1395 1400 1405

Lys Thr Leu Leu Glu Tyr Leu Glu Ser Arg Gly Cys Leu Asp Ser Leu  
1410 1415 1420

Pro Asp His Asn Gln Leu Ser Leu Phe  
1425 1430

<210> 185

<211> 199

<212> PRT

<213> Thermus thermophilus

<400> 185

Thr Pro Lys Gly Lys Asp Leu Val Arg His Leu Glu Asn Arg Ala Lys  
1 5 10 15

Arg Leu Gly Leu Arg Leu Pro Gly Gly Val Ala Gln Tyr Leu Ala Ser  
20 25 30

Leu Glu Gly Asp Leu Glu Ala Leu Glu Arg Glu Leu Glu Lys Leu Ala  
35 40 45

Leu Leu Ser Pro Pro Leu Thr Leu Glu Lys Val Glu Lys Val Val Ala



50

55

60

Leu Arg Pro Pro Leu Thr Gly Phe Asp Leu Val Arg Ser Val Leu Glu  
 65 70 75 80

Lys Asp Pro Lys Glu Ala Leu Leu Arg Leu Gly Arg Leu Lys Glu Glu  
 85 90 95

Gly Glu Glu Pro Leu Arg Leu Leu Gly Ala Leu Ser Trp Gln Phe Ala  
 100 105 110

Leu Leu Ala Arg Ala Phe Phe Leu Leu Arg Glu Met Pro Arg Pro Lys  
 115 120 125

Glu Glu Asp Leu Ala Arg Leu Glu Ala His Pro Tyr Ala Ala Lys Lys  
 130 135 140

Ala Leu Leu Glu Ala Ala Arg Arg Leu Thr Glu Glu Ala Leu Lys Glu  
 145 150 155 160

Ala Leu Asp Ala Leu Met Glu Ala Glu Lys Arg Ala Lys Gly Gly Lys  
 165 170 175

Asp Pro Trp Leu Ala Leu Glu Ala Ala Val Leu Arg Leu Ala Arg Pro  
 180 185 190

Ala Gly Gln Pro Arg Val Asp  
 195

<210> 186

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 186

gcccagtacc tcgcctccct cgagggg

27

<210> 187

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 187

ggcccccttg gccttctcgg cctccat

27

<210> 188

<211> 331

<212> DNA

<213> *Thermus thermophilus*

<400> 188

agactcgagg ccctggagcg ggagctggag aagcttgccc tcctctcccc acccctcacc 60  
ctggagaagg tggagaagggt ggtggccctg aggccccccc tcacgggctt tgacctggtg 120  
cgctccgtcc tggagaagga ccccaaggag gccctcctgc gcctcaggcg cctcagggag 180  
gagggggagg agccccctcag gctcctcggg gccctctcct ggcagttcgc cctcctcgcc 240  
cgggccttct tcctcctcgg ggaaaacccc aggcccaagg aggaggacct cgcccgcctc 300  
gagggcccacc cctacgccgc caagaaggcc a 331

<210> 189

<211> 110

<212> PRT

<213> *Thermus thermophilus*

<400> 189

Arg Leu Glu Ala Leu Glu Arg Glu Leu Glu Lys Leu Ala Leu Leu Ser  
1 5 10 15

Pro Pro Leu Thr Leu Glu Lys Val Glu Lys Val Val Ala Leu Arg Pro  
20 25 30

Pro Leu Thr Gly Phe Asp Leu Val Arg Ser Val Leu Glu Lys Asp Pro  
35 40 45

Lys Glu Ala Leu Leu Arg Leu Arg Arg Leu Arg Glu Glu Gly Glu Glu  
50 55 60

Pro Leu Arg Leu Leu Gly Ala Leu Ser Trp Gln Phe Ala Leu Leu Ala  
65 70 75 80

Arg Ala Phe Phe Leu Leu Arg Glu Asn Pro Arg Pro Lys Glu Glu Asp  
85 90 95

Leu Ala Arg Leu Glu Ala His Pro Tyr Ala Ala Lys Lys Ala  
100 105 110

<210> 190  
<211> 31  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 190

gtggtgtcta gacatcataa cggttctggc a

31

<210> 191

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR Primer

<400> 191

gagggccacc accttctcca ccttctc

27

<210> 192

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR Primer

<400> 192

ctccgtcctg gagaaggacc ccaag

25

<210> 193

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<220>

<221> primer\_bind

<222> (15)

<223> S at position 15 can be either C or G

<220>  
 <221> primer\_bind  
 <222> (27)  
 <223> S at position 27 can be either C or G

<400> 193  
 cgcggaattca acgcsctcct caagacsct

29

<210> 194  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: PCR primer

<400> 194  
 gacacttaac atatggtcat cgccttcacc g

31

<210> 195  
 <211> 38  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: PCR primer

<400> 195  
 gtgtgtgaat tcgggtcaac gggcgaggcg gaggaccg

38

<210> 196  
 <211> 10  
 <212> PRT  
 <213> Deinococcus radiodurans

<400> 196  
 Val Ile Leu Asn Pro Gly Ser Val Gly Gln  
 1 5 10

<210> 197  
 <211> 10  
 <212> PRT  
 <213> Methanococcus jannaschii

<400> 197

Tyr Leu Ile Asn Pro Gly Ser Val Gly Gln  
1 5 10

<210> 198

<211> 10

<212> PRT

<213> *Thermotoga maritima*

<400> 198

Leu Val Leu Asn Pro Gly Ser Ala Gly Arg  
1 5 10

<210> 199

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 199

ctgggtgaacc cgggctccgt gggccagc

28

<210> 200

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 200

Leu Leu Val Asn Pro Gly Ser Val Gly Gln  
1 5 10

<210> 201

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 201  
ctcgaggagc ttgaggaggg tggtggc

27

<210> 202  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: polypeptide

<400> 202  
Ala Asn Thr Leu Leu Lys Leu Leu Glu  
1 5

<210> 203  
<211> 32  
<212> PRT  
<213> *Deinococcus radiodurans*

<400> 203  
Gly Phe Gly Gly Val Gln Leu His Ala Ala His Gly Tyr Leu Leu Ser  
1 5 10 15  
Gln Phe Leu Ser Pro Arg His Asn Val Arg Glu Asp Glu Tyr Gly Gly  
20 25 30

<210> 204  
<211> 32  
<212> PRT  
<213> *Caenorhabditis elegans*

<400> 204  
Gly Phe Asp Gly Ile Gln Leu His Gly Ala His Gly Tyr Leu Leu Ser  
1 5 10 15  
Gln Phe Thr Ser Pro Thr Thr Asn Lys Arg Val Asp Lys Tyr Gly Gly  
20 25 30

<210> 205  
<211> 32  
<212> PRT  
<213> *Pseudomonas aeruginosa*

<400> 205  
Gly Phe Ser Gly Val Glu Ile His Ala Ala His Gly Tyr Leu Leu Ser  
1 5 10 15  
Gln Phe Leu Ser Pro Leu Ser Asn Arg Arg Ser Asp Ala Trp Gly Gly  
20 25 30

<210> 206  
<211> 32  
<212> PRT  
<213> *Archaeoglobus fulgidus*

<400> 206  
Gly Phe Asp Ala Val Gln Leu His Ala Ala His Gly Tyr Leu Leu Ser  
1 5 10 15  
Glu Phe Ile Ser Pro His Val Asn Arg Arg Lys Asp Glu Tyr Gly Gly  
20 25 30

<210> 207  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: PCR primer

<400> 207  
catcctggac tcggcccacc tcctcaccga 30

<210> 208  
<211> 9

<212> PRT  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 208

Ile Leu Asp Ser Ala His Leu Leu Thr  
1 5

<210> 209

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 209

gaggaggtag ccgtgggccg cgtggagctc cac 33

<210> 210

<211> 11

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 210

Val Glu Leu His Ala Ala His Gly Tyr Leu Leu  
1 5 10

<210> 211

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 211

ggctttccca tatggctcta caccgggctc ac 32



<210> 212

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 212

gcgtggatcc acggtcatgt ctctaagtc

29

09716964.112100